RAF Brize Norton Airspace Change

Proposal Document

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Executive Summary

Royal Air Force (RAF) Brize Norton in Oxfordshire is the largest RAF station with approximately 5,800 service personnel, 1,200 contractors and 300 civilian staff. It is home to the RAF's Strategic and Tactical Air Transport (AT) and Air-to-Air Refuelling (AAR) forces, as well as host to many lodger and reserve units. With its mixed fleet of aircraft, RAF Brize Norton provides rapid global mobility in support of UK overseas operations and exercises, as well as AAR support for fast jet aircraft both on operations and in support of UK Homeland Defence.

The dimensions of the Controlled Airspace (CAS) surrounding RAF Brize Norton have been in place for over 40 years, with very few adjustments. With the change of aircraft types now using the aerodrome, coupled with the criteria used to design the procedures, the current design is no longer appropriate for current arrival and departure profiles. Aircraft regularly leave the protected confines of CAS, which can bring them into conflict with other aircraft operating autonomously outside in uncontrolled airspace. Additionally, RAF Brize Norton has no connectivity to the UK airways network, meaning aircraft must transit through uncontrolled airspace when flying to and from the UK airways network. This often involves troop carrying aircraft which potentially exposes military personnel deploying or returning from operational environments, as well as those communities they overfly, to an unacceptable level of risk.

We consulted in the spring of 2018 on a proposed design based on increasing the size of the Class D Control Zone (CTR) and adding Class D Control Areas (CTAs) to provide the connectivity with the airways network. Our proposed design was met with considerable objection, particularly from the General Aviation (GA) community. Their main concern was that the increased volume of Class D Controlled Airspace (CAS) in Oxfordshire would create a barrier, particularly to recreational aviators, and would therefore introduce funnelling and pinch points around the CAS as many aviators would choose to route around the airspace.

RAF Brize Norton reflected on the results of the consultation and sought to seek alternative measures that would still meet the project's stated objectives, but in a way that would be more sympathetic to those members of the GA community who choose to avoid CAS. We undertook several design reviews and presented updated designs via Stakeholder Engagement Events to key representatives of the GA organisations. Each of the reviews sought to minimise the volume of CAS and make it easier for other stakeholders to access greater volumes of airspace, whilst still providing the protection and containment required.

The final design that is being submitted to the CAA for consideration incorporates a mixture of Class D airspace for the CTR and the airspace directly abutting Class A airspace in the en-route structure. In addition, some of the CTAs are now Class E CAS, with the addition of an element of conspicuity, provided by either a radio call or by displaying a transponder code. This makes it Class E + Radio Mandatory Zone (RMZ) and/or Transponder Mandatory Zone (TMZ). Under this arrangement, aircraft operating under Visual Flight Rules (VFR) may enter the Class E CAS without a clearance from Air Traffic Control (ATC) providing they comply with either the RMZ or TMZ rules. VFR aircraft will be required to avoid aircraft operating under Instrument Flight Rules (IFR), and other VFR aircraft.

Throughout this process, RAF Brize Norton has sought to strike a balance between its own requirements and those of its neighbours. We believe that active engagement with key

stakeholders has led to a final design that demonstrates that we have found what we believe is a workable solution.

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1 Introduction

1.1 Military Regulatory Construct

Part of the Defence Safety Authority (DSA), the Military Aviation Authority (MAA) is responsible for the regulation, surveillance and assurance of the defence air operating and technical domains. It ensures the safe design and use of military air systems.

In Regulatory Article (RA) 1020, the MAA identifies the concept of the 'Aviation Duty Holder' (ADH) who is responsible for:

> "*Air Safety and ensuring that associated Risk to Life (RtL) for the Air Systems within their Area of Responsibility (AoR) is As Low As Reasonably Practicable (ALARP) and Tolerable.*"

In their roles and responsibilities, the MAA states that:

> "*ADHs are legally accountable for the safe operation, continuing Airworthiness and maintenance of systems in their AoR and for ensuring that RtL is ALARP and Tolerable.*"

The Duty Holder (DH) for Royal Air Force (RAF) Brize Norton is the Station Commander. In accordance with their legal accountability to both the MAA, DSA and Defence, the Station Commander has sought to address an identified safety risk through the development of this airspace change proposal.

1.2 General

An independent safety assessment conducted by Atkins in 2012, identified that one of the main risks held by the RAF Brize Norton DH was that of a mid-air collision between RAF Brize Norton assets and another aircraft. It also recommended that an airspace change was conducted, and this was initiated in 2013. Further analysis concluded that one of the main areas of risk concerned aircraft leaving the existing Class D (Controlled Airspace – CAS) Control Zone (CTR) and joining the national en-route network during which time flights were conducted in Class G airspace.

Amongst many types, RAF Brize Norton operates wide-bodied aircraft with capacity for 291 passengers; its operations are therefore comparable to a number of civil airports that are connected by Controlled Airspace (CAS) to the national airways network or en-route structure. Those airports that do not have connectivity to the airways network are often in areas of the UK that do not see the same levels of aviation activity as the Oxfordshire area that surrounds the RAF station. Of relevance, the nature of RAF Brize Norton aircraft, freight or passenger, often attracts a strategic and international significance.

1.3 Process

Although oversight of aviation activities at RAF Brize Norton is undertaken by the MAA and DSA, any airport that wishes to make changes to the classification of

airspace must follow an airspace change process to submit an Airspace Change Proposal (ACP) for which guidance is provided by the Civil Aviation Authority (CAA). In the case of RAF Brize Norton, as it is a military airfield, it is not required to follow the guidance for introducing new routes. However, new routes are proposed which influence the airspace requirements directly. Therefore, although they are not in themselves subject to CAA approval, the Sponsor has been transparent about the procedures as they underpin the airspace proposals and, for completeness, have therefore included them as part of this submission.

The process to be applied at the time that the project was started in 2013 was articulated within CAA Publication (CAP) 725 entitled "CAA Guidance on the Application of the Airspace Change Process" [Reference 1]. Such is the complexity of the project, compounded by a concurrent ACP being run by neighbouring London Oxford Airport (LOA) and the number of aviation and non-aviation stakeholders who felt that they might be affected by a proposed change, the project has taken several years to develop. In 2015 the CAA commenced a review which led to consultation on a new process. The new process guidance, CAP 1616 "*Airspace Change: Guidance on the regulatory process for changing the notified airspace design and planned and permanent redistribution of air traffic, and on providing airspace information*" [Reference 2] was introduced in January 2018. However, legacy projects were not required to transition to the new process provided they had reached a specified level of maturity. The CAA assessed that both the RAF Brize Norton ACP and that of LOA should remain on the legacy CAP 725 process.

The new CAP 1616 process requires a greater degree of transparency and increased levels of engagement with those aviation and non-aviation stakeholders who may potentially be affected by a proposed change. Recognising this change of emphasis, RAF Brize Norton has sought to acknowledge the spirit of CAP 1616 by hosting several events to facilitate a detailed level of collaboration with its key stakeholders during the development of this ACP.

1.4 This Document

This document represents the formal submission to the CAA of the changes to the local airspace arrangements that RAF Brize Norton is seeking to implement. It is in part technical in nature, as these elements are required for the CAA to assess the proposal, but mindful of the interest we have had in this project, and the wide background of the stakeholders, we have tried to use plain English as far as possible.

2 CAP 725 Airspace Change Process Guidance

2.1 Overview of the Process

At the commencement of this project, the CAA process in place for airports to make changes to their airspace arrangements was CAP 725 "*Airspace Change Process Guidance*". Full details of the process remain available online, but the document and the process itself was superseded by CAP 1616 in January 2018.

CAP 1616 was introduced following a period of consultation conducted by the CAA[1], in order to ensure a greater degree of transparency and increased levels of engagement with key stakeholders who may be affected by an airspace change. There is no direct read across from the CAP 725 stages to those of CAP 1616; however, RAF Brize Norton has modified its approach to CAP 725 to align its activities with the intent specified in CAP 1616.

2.2 Legacy Arrangements

When CAP 1616 process was introduced in January 2018, the CAA stipulated that those airports already conducting changes under CAP 725 could remain on that process if they met the following specific criteria:

1. The project had already commenced Stage 4 – Formal Consultation; and
2. The project would not create a net increase of more than 10,000 people exposed to the 54 dBA noise contour.

These criteria are derived from guidance specified within Air Navigation Guidance 2014 (ANG 2014) [Reference 3] which suggested that the point at which members of the public become annoyed by aircraft noise is 54 dBA; CAP 725 requests sponsors measure to 57 dBA.

The MOD is not required to conduct environmental assessments associated with an ACP unless the proposed change alters existing civil air routes. However, in order to again demonstrate compliance with the spirit of the CAP 1616 process, an environmental assessment was conducted and submitted to the CAA, to confirm that the proposed changed met the criteria articulated within ANG 2014. The CAA was satisfied that RAF Brize Norton complied with the guidance and the project was not required to transition to CAP 1616.

2.3 Recognising a Changing Environment

CAP 725 requires a degree of stakeholder engagement before a Sponsor presents their proposals through a period of consultation. The Sponsor must respond to feedback and adjust or amend that proposal before submission to the CAA.

[1] CAP 1520 Draft Airspace Design Guidance was issued in March 2016. The report detailing the response to the consultation CAP 1485 was published in October 2016.

Although, this project has been conducted in accordance with CAP 725 the Sponsor has made every effort to respond appropriately and accommodate the strong message expressed by its stakeholders during the consultation process.

Equally, this has been a long running project and the Sponsor has taken every opportunity to recognise and react to the changing perceptions and appetites for certain airspace solutions, as they have evolved.

Most importantly, as a responsible airspace user, the Sponsor recognises the need to compromise and to adapt its proposals to reflect the strong opinions expressed by other airspace users both nationally and particularly at a local level. This proposal represents a workable solution that recognises and deals with those elements of its initial design that proved controversial with the GA community.

2.4 This Document

This document represents the formal proposal submission that is required by the CAA in order to assess the application ahead of a regulatory decision. Figure 1 below shows the current stage in the process.

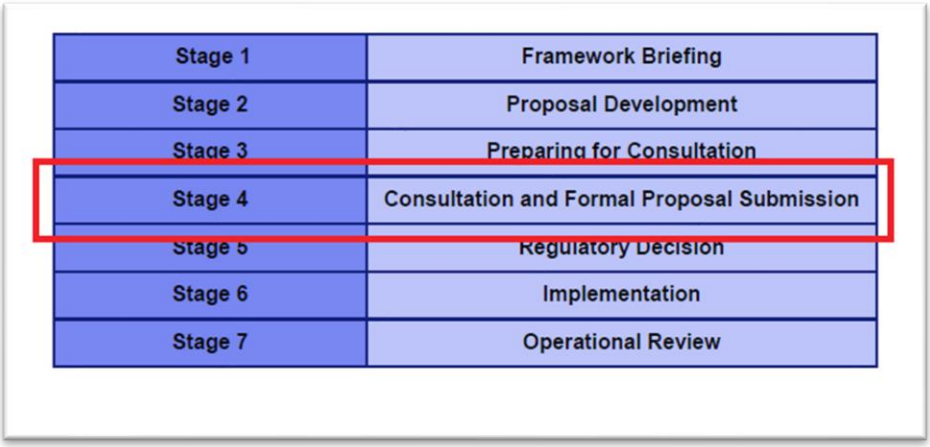


Figure 1 – CAP 725 ACP Stages

The CAA will consider whether the process has been followed correctly, and whether an adequate case for increased volumes of CAS has been justified.

2.5 Next Steps

The CAA will review the documentation to ensure that it meets the requirements of the CAP 725 process. The CAA will pass the details on to the DfT and notice will be given for members of the public to request that the project is called in by the Secretary of State (SoS) for Transport. The project will only be liable for call in if it meets specific criteria, and even if it meets the criteria, the SoS may determine that the project can be decided under the normal CAA processes.

The CAA requires a minimum of 17 weeks in order to assess the information and make a Regulatory Decision on the case for additional airspace.

3 Justification for the Change and Analysis of Change Options

3.1 Overview

This section provides the background and the development of the airspace design and presents the justification for the change. We show how, in accordance with CAP 725, the design matured to what was presented within the public consultation. We will demonstrate how we listened carefully to the consultation feedback and modified our initial design accordingly.

3.2 The RAF Brize Norton Task

RAF Brize Norton is the largest RAF Station with approximately 5,800 Service Personnel, 1,200 contractors and 300 civilian staff. The Station is home to the RAF's Strategic and Tactical Air Transport (AT) and Air-to-Air Refuelling (AAR) forces, as well as host to many lodger and reserve units.

With its mixed fleet of aircraft, RAF Brize Norton provides rapid global mobility in support of UK overseas operations and exercises, as well as AAR support for fast jet aircraft both on operations and in support of UK Homeland Defence.

RAF Brize Norton is also the only station in the RAF to be designated as a Military Emergency Diversion Aerodrome. This means that it stands ready to accept diversions from any military aircraft that may have a requirement to land within the UK. MEDA aerodromes are available 24/7 and have a minimum Fire Rescue Category and medical facilities available. MEDAs are available for any military aircraft, UK based or foreign, including fast jets. It is important that the RAF Brize Norton airspace appropriately reflects the critical nature of this broad operational requirement.

3.3 MOD Safety Analysis

The MOD identified a range of flight safety issues through routine Defence Aviation Safety Management System (DASMS) processes. In 2011 they commissioned an independent Scoping Study of the requirement for an ACP to address its emerging Flight Safety concerns. The Study examined existing operations and the requirement for an ACP; it also considered a range of other possible activities to mitigate the issues identified. It confirmed that RAF Brize Norton already employs all relevant standard operating measures to mitigate risk as defined within CAA Policy Statement Flight Outside Controlled Airspace [Reference 4]. The predominant flight safety issue identified by RAF Brize Norton is the risk of mid-air collision between large transport and tanker aircraft, as they transit to and from CAS, and GA aircraft in the Oxford AIAA, outside the RAF Brize Norton CTR. This latter interaction occurs mostly below 5000 ft, where GA traffic is most dense and where RAF Brize Norton aircraft are most vulnerable due to their slow speed which makes manoeuvrability difficult. The issue had already

been identified in a DAP AIAA Review in November 2008 [Reference 5], where it was recommended that 'HQ Air Command (ATC) and RAF Brize Norton should consider reviewing the requirement and dimension of the AIAA as part of the Brize Norton CTR airspace change proposal'. Such risks were also identified in the RAF Brize Norton Aviation Support Risk Register (ASRR) and the Battlespace Management Safety Management Manual (BM SMM) Risk Registers. Although the current levels of service are assessed as inherently safe, this assessment is reliant on the high level of Air Traffic Control Officer (ATCO) intervention, necessary because of the large number of "unknown" aircraft that routinely operate in the Oxford AIAA. The current acceptable level of safety is evidenced by the relatively low numbers of actual AIRPROX reports. However, the risk of a mid-air collision (MAC) within 20 nm of RAF Brize Norton has been analysed during a MOD Safety Survey and was assessed as HIGH.

The principle of DASMS is that:

> "*Aviation Duty Holders are legally accountable for the safe operation of systems in their Area of Responsibility (AoR) and for ensuring that Risks to Life (RtL) are reduced to at least ALARP and tolerable*".

A risk is ALARP when the cost of any further risk reduction (where the cost includes the loss of Defence capability as well as financial or other resource costs) is judged to be grossly disproportionate to the benefit obtained from that risk reduction. Also, the MAA Charter, issued by the SofS for Defence, states that:

> "*Where Defence can rely on exemptions or derogations from either domestic or international law, under the SofS's delegated authority the MAA will introduce standards and management arrangements that produce outcomes that are, so far as reasonably practicable, at least as good as those required by legislation.*"

The CAA policy for flights outside CAS is that Public Transport flights are conducted wherever possible within CAS; where this is not possible those flights should utilise the highest level of ATS available. Whilst military aircraft operating from RAF Brize Norton are neither 'public transport[2]', nor 'commercial air transport[3]', they are large aircraft, mostly derivatives of commercial aircraft and often carry large numbers of passengers. Taking societal concern into account, a mid-air collision would potentially involve large numbers of people and therefore an acute and significant RtL. Measures introduced to mitigate this class of risk need to be considered on a case-by-case basis and should also take into account the political dimension. It is therefore reasonable for MOD to apply safety factors to military passenger flights that are coherent with civilian best practice where reasonably practicable, and that these aircraft should be operated 'under standards and management arrangements at least as good as those required by legislation'.

Since 2012, there have been several AIRPROX[4] incidents as well as other mandatory reportable incidents within the RAF Brize Norton area which serve to

[2] Public Transport is considered as "valuable consideration has been given or promised for the carriage of passengers".
[3] Commercial Air Transport is considered as "the carriage by air of passengers, mail and/or cargo for remuneration and/or hire".
[4] CAP 493 Manual of Air Traffic Services Part 1 describes an AIRPROX as: " a situation in which, in the opinion of a pilot or a controller, the distance between aircraft as well as their relative positions and speeds have been such that the safety of the aircraft involved was or may have been compromised."

demonstrate the busy nature of the local airspace. A table of Reportable Safety Events which included AIRPROX events investigated by the United Kingdom Airprox Board (UKAB) was included within the Consultation Document issued in 2017 [Reference 6]. There have been several reportable safety events since then and a table with the relevant details has been updated at Annex A4. Whilst the number of events is still relatively low in relation to the high number of aircraft movements, the evidence suggests that events are still taking place, despite the effective service provided by RAF Brize Norton ATC. Providing avoiding action places demands on controller capacity which at best reduces efficiency, and at worst can affect safety margins.

3.4 Current Airspace Arrangements

3.4.1 Local Airspace

RAF Brize Norton is situated within a Class D (CAS) Control Zone (CTR) as shown in Figure 2 below. The CTR extends from the surface up to 3,500 feet (ft) above mean sea level (amsl). Most airports that have CTRs have a rectangle or lozenge shape that would apply the same degree of containment to the final approach/climb-out. The RAF Brize Norton CTR is not a conventional shape and was likely truncated to accommodate operations at neighbouring LOA (or Kidlington as it would have been known in the past).

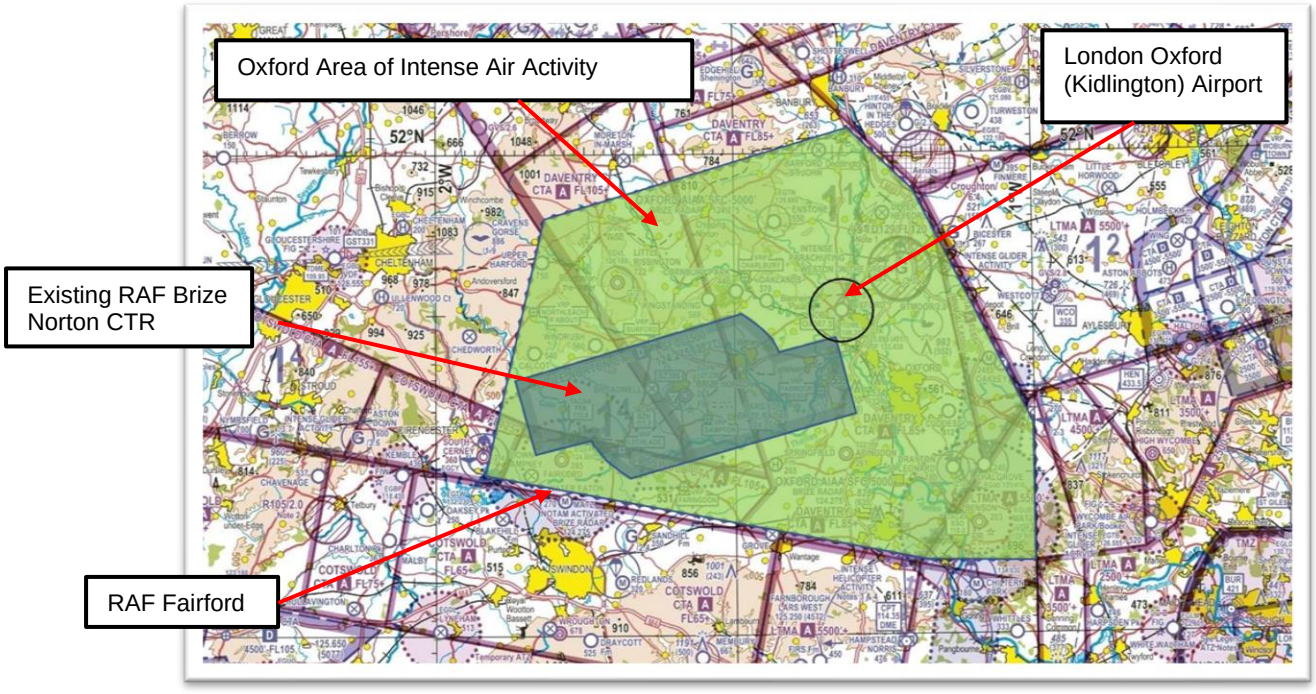


Figure 2 – RAF Brize Norton Existing Airspace Situation

It is important to recognise that the vertical and lateral dimensions of the RAF Brize Norton CTR have not altered significantly since its inception over 40 years ago. However, the RAF air transport fleet has significantly changed in the intervening period, evolving from the VC10s which entered service in the 1960s and Tristar aircraft of the 1980s to the modern fleets of the Voyager (A330), Atlas

(A400M), Globemaster (C17) and Hercules (C130J) aircraft, alongside a wide range of civil operators. Due to fleet changes, and regulatory changes to IFP design, the RAF Brize Norton CTR no longer fully contains the IFP operations of aircraft currently based at the Unit.

Figure 2 shows the relative position of LOA to RAF Brize Norton. The southernmost edge of the LOA ATZ adjoins the Class D CTR surrounding RAF Brize Norton. A formal Letter of Agreement between the two airports ensures that safe separation between aircraft is currently maintained. The surrounding airspace is complex and supports a wide variety of civil and military aviation activities. These include the airfields at RAF Benson, RAF Fairford, Abingdon and the combined glider and parachute dropping sites at RAF Weston-on-the-Green and RAF Little Rissington, plus several other very active gliding sites. This extremely high level of activity and complexity takes place within the Oxford Area of Intense Air Activity (AIAA) (shown in green on the image).

3.4.2 The Oxford AIAA

The Oxford AIAA extends from the surface up to 5,000 ft amsl. Whilst the designation of an AIAA indicates to all aviators that the area is a volume of Class G airspace that may be more congested than other areas, it offers no additional protection to aircraft operating within it.

The UK Integrated Aeronautical Information Publication (UK IAIP) [Reference 7] ENR 1.1 describes an AIAA as:

> "5.2.2 *Airspace within which the intensity of civil and/or military flying is exceptionally high or where aircraft, either singly or in combination with others, regularly participate in unusual manoeuvres*."
>
> 5.2.2.1 *Intense civil and/or military air activity takes place within the areas listed in ENR 5.2. Pilots of non-participating aircraft who are unable to avoid AIAAs are to keep a good lookout and are strongly advised to make use of a radar service if available; these areas are depicted at ENR 6-76.*"

The UK IAIP ENR Section 5.2 provides the following remarks specifically for the Oxford AIAA:

> "***Remarks**: There is intense air activity associated with closely woven civil and military climb out and approach procedures for the many airfields in the vicinity. Pilots flying in this area are advised to keep a constant vigilance particularly during weekdays when military activity is at its peak, and especially in the area 8.5 nm/308° (T) and 6 nm/145° (T) from Oxford/Kidlington aerodrome where aircraft may be holding awaiting clearance to join airways*."

The UK IAIP also contains the following advisory measures:

> "***Advisory Measures**: Radar services are available within this area from Brize Norton ATC on 124.275 MHz. The attention of pilots is also drawn to the Brize Norton Control Zone. (See ENR 2.1)."*

In meeting the stated project objectives, this ACP is seeking to mitigate several issues prevalent within the Oxfordshire AIAA:

- Acknowledgement of the exceptionally high intensity of civil and military operations.
- Improving the interaction between civil and military climb out and approach procedures.

- Provision of protection to wide-bodied passenger aircraft that currently transit through busy Class G airspace and may need to make short notice avoiding action turns to remain separated from unknown aircraft, or may need to hold outside CAS before obtaining a joining clearance.
- Promote the availability of, and encourage use of, a radar service to aircraft operating within the AIAA.

3.5 Current Operational Issues

3.5.1 Interactions with London Oxford Airport (LOA)

Currently, due to the relative positions of each runway, the RAF Brize Norton and LOA published procedures cannot always ensure that standard separation is maintained between aircraft without extensive controller intervention. The published Missed Approach Procedure (MAP) for Runway 19 at LOA is designed to remain outside of the existing CAS of the RAF Brize Norton CTR. However, the existing CTR does not fully contain the existing RAF Brize Norton Instrument Flight Procedures (IFPs); occasionally, aircraft positioning for final approach at RAF Brize Norton leave CAS and might come into confliction with aircraft executing a MAP at LOA. This is resolved by ATCO intervention at either or both units.

RAF Brize Norton aircraft have also been involved in reportable safety related incidents, often when its aircraft have been unable to remain within the current RAF Brize Norton controlled airspace volume. This has an impact on LOA operations because LOA ATCOs must anticipate when RAF Brize Norton aircraft may be unable to remain inside the RAF Brize Norton CTR, and consequently when avoiding action may be necessary by aircraft under LOA control.

To contribute towards addressing the issues highlighted above, LOA is also proposing an airspace change together with the introduction of new GPS-based IFPs. The CAA has also directed that both airports engage with each other to capitalise on the opportunity to jointly design a workable airspace solution that mitigates the extant risks and issues previously highlighted. The overall aim is to reduce the levels of perceived risk by reducing sole reliance on controller intervention to preserve separation standards.

A combination of the relative positions of LOA and RAF Brize Norton together with the UK prevailing winds, means that LOA uses Runway 19 approximately 70% of the time. This means that LOA arrivals come from the north whilst RAF Brize Norton is predominantly operating from Runway 25. Consequently, for 70% of the time the departures from LOA will be to the south, meaning that coordination with RAF Brize Norton ATCOs must take place. This is currently the normal procedure founded on a good working relationship between the two airports. Figure 3 below shows the existing overlapping procedure tracks. The areas that require specific controller focus are where the patterns intercept each other; the act of negotiating a coordination agreement is time consuming and further reduces controller capacity. The proposed airspace change aims to reduce the reliance on controller intervention to resolve these potential conflictions.

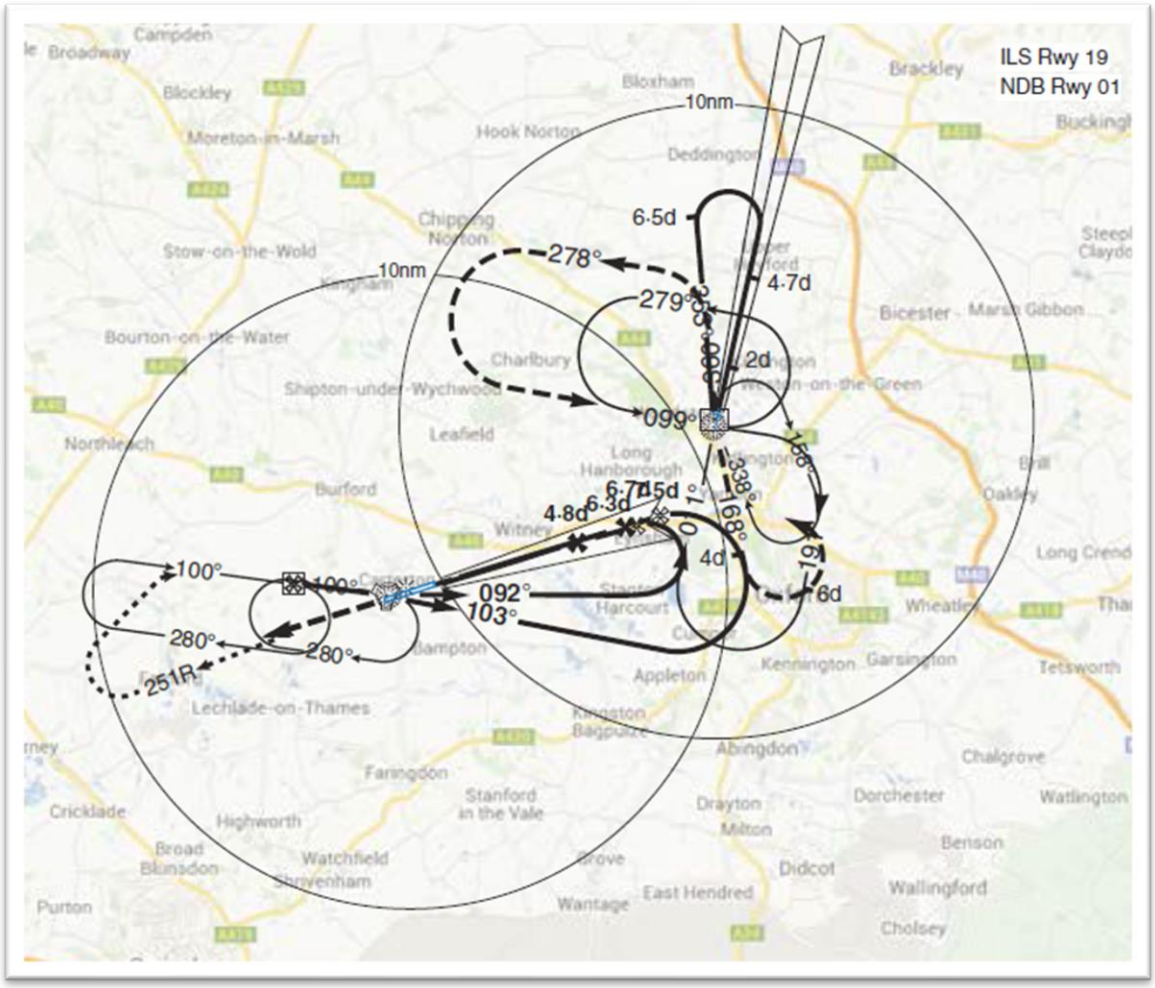


Figure 3 - Current RAF Brize Norton Runway 25 Arrivals and LOA Runway 19 Departures / Runway 01 Arrivals

3.6 Key Drivers for Change

Enhanced Safety

The principal project objective for the MOD is to enhance the safety of aircraft operations at and within the vicinity of RAF Brize Norton. The independent Scoping Study in 2012 identified that one of the ways to reduce the potential RtL from a MAC between a RAF Brize Norton aircraft and another aircraft outside CAS was to consider an ACP to provide connectivity to the airways network and to ensure the associated IFPs were appropriately contained. Therefore, in detail the reasons for requesting this change are as follows:

- Aircraft joining or departing the airways structure have to cross busy Class G airspace between the CTR and the airways network. This proposal will help to reduce the risk of a mid-air collision of a RAF Brize Norton aircraft with a GA aircraft within 20 nm of RAF Brize Norton.
- Aircraft positioning for final approach to the runway are not fully contained by the current CAS which potentially brings them into conflict with unknown traffic.

- The interaction of RAF Brize Norton and LOA flight procedures is complex, and workload is unnecessarily intensive for both airports' ATC staff.

The current CTR does not contain the existing RAF Brize Norton operations due to an evolution of aircraft types. Wide-bodied passenger aircraft are transiting through Class G airspace during a critical stage of flight, posing a potential risk to the aircraft and to local communities, that could largely be mitigated by this ACP. Large military and civil charter aircraft are required to transit through busy Class G (uncontrolled) airspace prior to entry to CAS, and are often given avoiding action to remain clear of unknown traffic; this increases cockpit and ATCO workload, limiting capacity with consequent ramifications for the provision of a safe service.

An independent Scoping Study [Reference 8] commissioned by RAF Brize Norton stated that a key benefit of an ACP would be:

> *"to provide aircraft operating with significant extra protection, which would significantly mitigate the risk of mid-air collision currently held by the Operational Duty Holder (ODH)".*

3.6.1 Improvement to the Current Situation

Aircraft departing from and arriving at RAF Brize Norton will routinely join airway Q63 (formerly known as L9) to the south of the airfield; this provides access to the national airways network and the global reach required by Defence. The ATCOs at RAF Brize Norton will notify Sector 23 about the aircraft's departure time (known as a pre-note) and they will obtain a joining clearance for CAS which is only valid for a specific period. If there is conflicting traffic, then avoiding action may be required before the aircraft joins CAS which may affect the clearance issued. In civil terms, this is equivalent to a heavily laden long-haul aircraft that has just departed an airport holding outside CAS whilst negotiating an airways' joining clearance.

The NAXAT Standard Instrument Departure (SID) requires aircraft to route via NAXAT to join the airways network at MALBY. This point is close to Cotswold (Kemble) Airport and South Cerney airfields, both of which are known to operate non-transponding aircraft. Typically, over 60% of all the aircraft types departing RAF Brize Norton utilise this SID. Similarly, aircraft arriving at RAF Brize Norton follow a Standard Terminal Arrival Route (STAR) from Airway Q63. This proposal intends to contain these arrival and departure procedures within CAS as described more fully at Section 10.

Air traffic controllers currently provide aircraft within the Class D CTR with a Radar Control Service. This is intended to afford the highest level of protection to aircraft within the most critical phases of flight, either during training or at the beginning or end of a long-haul flight. However, when aircraft are unable to remain within the confines of the CAS on arrival, or when aircraft leave the CTR to join airways, controllers provide a different level of service to aircraft. These segments of flight currently take place in Class G uncontrolled airspace. The highest service available within Class G airspace is a Deconfliction Service (DS) where controllers will aim to provide 5 nm lateral separation, or where height information exists 3,000 ft vertical separation against unknown traffic.

These separation criteria can be extremely difficult to achieve within the areas of high traffic density typically encountered around RAF Brize Norton. This is because General Aviation (GA) operating within Class G airspace do not need to

call any ATC unit or operate a transponder when operating autonomously. Without knowing the intentions of GA aircraft, it is difficult for ATCOs to predict their respective flight paths and to ensure a safe distance can be maintained between aircraft. The situation is further complicated because all RAF Brize Norton based aircraft invariably require a wide turn radius. In order to maintain safe separation criteria, controllers often issue avoiding action instructions to pilots under their control.

The second and third order consequences that potentially resulting from issuing these types of instructions must be understood: they add to what is already a high cockpit workload at a critical phase of flight; they also add to the ATCO workload which may increase the risk of a loss of standard separation. Since 2012, ATC personnel have logged many instances where aircraft have deviated from published procedures due to ATC intervention in order to avoid unknown traffic and ensure maintenance of the prescribed separation. The Consultation Document contained details of these occurrences (up to the start of the consultation period) and the numbers of Flight Safety Reports raised by ATCOs and Pilots.

Although a Deconfliction Service (DS) offers the highest level of ATC service outside of CAS, it is not automatically provided: the pilot is asked what type of service is required on leaving CAS. When in receipt of a Traffic Service (TS), controllers provide pilots with traffic information about aircraft that will potentially conflict, but it is the pilot's responsibility to ensure that safe separation standards are maintained. It is impossible to capture every ATCO or pilot initiated avoiding action event, and therefore, pilot actions to resolve conflictions whilst in receipt of a TS could not be captured within the statistics shown within the Consultation Document. Consequently, the statistics gathered only partially evidence the number of aircraft that leave the confines of the existing CAS whilst conducting an arrival procedure.

3.6.2 Training Requirement within the CTR

The RAF seeks to maintain an agile, adaptable force capable of deploying wherever the government requires. Whilst training would not normally attract a high priority in terms of flight movements, the case for the MOD is different as training for operations is an ongoing, essential core activity. As well as conducting operational flights to maintain their capability for deployment worldwide, RAF Brize Norton aircraft also have a significant training requirement and routinely conduct multiple training sorties including up to 30 Instrument Flight Rules (IFR) approaches each day. This is in addition to on average 20 route-inbound flights. Around 75% of these approaches are pilot-interpreted procedural approaches, utilising current published Instrument Approach Procedures (IAPs) rather than radar-vectored approaches under positive ATC instruction. Many of these aircraft route close to the edge or outside the existing CTR. Additionally, there is a need to conduct tactical training and advanced high-energy manoeuvres with the support of military air traffic controllers who have experienced operational conditions. This freedom of manoeuvre includes conducting steep approaches and circuits, both visual and instrument, by day and night at varying altitudes, and to non-standard patterns. Night Vision Devices are also used and require controllers to take positive control of other traffic and to employ non-standard airfield lighting systems. The Brize CTR assures the required level of protection for tactical training both for the home-based aircraft and other aircraft that may be operating in the vicinity. Precision short field landing training, essential to ensure

a tactical re-supply capability both on operations and during humanitarian support missions, requires the use of multiple approach path angles as well as pilot interpreted final descent points. Special runaway markings simulating a short and narrow runway available at Brize Norton are essential to facilitate training and assessment of these techniques whist retaining sufficient safety margins to allow for instruction.

3.6.3 Implications of PANS-Ops Criteria on Airspace Volume

The MoD introduced the ICAO Procedures for Air Navigation Services - Aircraft Operations (PANS-OPS) to replace earlier APATC1 procedures, across all MoD airports bringing them in line with civil standards and procedures. Due to the differences in criteria, this meant that containment of pilot-interpreted procedural approaches within the existing CTR at RAF Brize Norton is not possible. PANS-OPS sets out the criteria for the design of SIDs and STARs and this often requires greater lateral dimensions of airspace than the APATC1 procedures that they replaced. At RAF Brize Norton, the existing CTR is too small to accommodate PAN-OPS procedures; aircraft routinely route close to the edge of CAS, and on occasions temporarily leave the CTR. The CTR does not meet the recommendations of the CAA CAS Containment Policy [Reference 9] para 3.2:

> *"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 shall normally not be less than 3 nms from the edge of CAS."*

3.6.4 Further Airspace Considerations

Since the RAF Brize Norton CTR no longer contains the IFPs, aircraft that temporarily leave the CTR whilst conducting an approach procedure risk conflicting with other aircraft legitimately operating adjacent to the CTR boundary within the busy Class G airspace. Statistics of the number of times aircraft left CAS whilst on a procedure were collated during the period between Nov 2012 and Jan 2014; this information was included within the RAF Brize Norton Consultation Document. The number of occurrences of aircraft unable to remain within the existing CTR should not be measured against the number of aircraft movements as the number of aircraft movements at RAF Brize Norton will fluctuate in line with any UK government commitment to operations[5]. What remains constant is their strategic significance and importance. Equally, while it should not be overplayed it should be recognised that, unlike their civil counterparts, RAF Brize Norton crews may be departing to or returning from a potentially hostile or unpredictable environment. The importance of this training requirement must be understood, as should the level of fatigue and workload unique to military operations; this must be considered when designing airspace for home-based operations.

3.7 Why Implement RNAV (GNSS) Flight Procedures

The MOD stated that one of their project objectives was to introduce Performance Based Navigation (PBN), sometimes referred to aRea Navigation (RNAV) or Global Navigation Satellite System (GNSS) procedures in harmony with the London Airspace Modernisation Programme (LAMP). LAMP has been incorporated into Future Airspace Strategy Implementation – South (FASI-S) programme under the Airspace Modernisation Strategy (AMS). RAF Brize Norton

[5] RAF Brize Norton aircraft movements data has been sent to the CAA separately.

has not been included as part of the FASI-S programme, but its aircraft need to be able to integrate with the airways network both now and in the future. Liaison with the LAMP programme and NATS Sector 23 has been the main conduit for this and a CONOPS and Letter of Agreement has been developed and agreed in principle to ensure safe integration and operation of the new airspace, if it is approved.

The move to RNAV technology was also directed at the 2007 36th International Civil Aviation Organization (ICAO) General Assembly where States agreed to Resolution 36/23 which urged them to implement routes and airport procedures in accordance with the ICAO PBN[6] criteria. EU legislation requires the implementation of RNP1[7] performance through the Common Pilot Project by 2024. ICAO resolution A37-11 also stipulated that by 2016 States complete a PBN implementation plan for en-route and terminal areas. In line with these directions, the CAA Future Airspace Strategy (FAS) (now known as the AMS or CAP 1711) sets out the plan to modernise UK and Irish airspace by 2020 in line with the legislative framework of the Single European Sky[8].

Whilst the MOD does not necessarily need to comply with ICAO or EASA regulation, it aspires to complying with civil regulations where possible. Therefore, as well as being one of the core project objectives, the MOD is seeking to ensure that RAF Brize Norton complies as far as practicable with civil regulations and seeks to future proof the operation at RAF Brize Norton. In addition, the MOD recognises that there are inherent safety and cost benefits to the use of RNAV technology:

- Safer and more efficient Air Traffic Control (ATC) services because fewer controller interventions are required to separate and re-route aircraft that come into conflict with one another.
- More accurate routes are flown making it easier to predict flight patterns and providing improved stabilisation of aircraft on approach. More stabilised approaches are safer and can generate less noise as aircraft perform fewer corrections to their vertical and lateral flight profile.
- Greater operational efficiency; accurate track keeping means less fuel burned, fewer flying hours, lower CO_2 emissions and an improved chance of a successful first approach during bad weather conditions as the aircraft will be in the optimum position to make a safe landing on the runway when possible.

3.8 Key Benefits of a New Airspace Design

As explained within Section 1.2, the MOD seeks to mitigate the potential RtL resulting from a mid-air collision between an RAF Brize Norton asset and another aircraft operating within Class G airspace. RAF Brize Norton has already adopted procedures and practices to reduce the potential RtL. The Scoping Study recommended that an ACP to provide connectivity to the airways network would

[6] Performance Based Navigation: specifies that navigation performance requirements are specified in terms of accuracy, integrity, availability, continuity and functionality when supported by the appropriate navigation infrastructure.
[7] Navigation performance of 1NM accuracy 95% of the time, with a defined level of integrity and continuous performance; all parameters monitored on board the aircraft with appropriate alerts.
[8] More information on the Single European Sky can be found at http://www.eurocontrol.int/dossiers/single-european-sky

reduce the potential RtL from a MAC to ALARP, reducing the reliance on controller intervention. Revised airspace arrangements with the establishment of additional CAS would:

- Provide aircraft with additional protection for airport departing, approaching or operating in the vicinity of RAF Brize Norton, to mitigate the risk of mid-air collision.
- Contain PANS-OPS procedures within controlled airspace.
- Decrease the number of avoiding action turns at a critical stage of flight.
- Provide additional protection to other IFR airspace users in the vicinity; for example, aircraft joining airways from LOA, RAF Fairford and Cotswold Airport (Kemble).
- Allow aircraft more direct routings which will have a positive environmental benefit[9].

This ACP seeks to implement the objectives of the Scoping Study through the CAP 725 process.

[9] No environmental modelling has been conducted. This benefit should be countered with a potential dis-benefit of aircraft that choose to avoid the airspace.

4 How the Proposal Was Developed

4.1 Overview

RAF Brize Norton has always been conscious of the potential impact of the proposed change to the local airspace arrangements. The Station is used to the operating environment and fully appreciates how popular the area is for recreational flying as well as commercial and military flying. The Station has always demonstrated a commitment to its local communities and the local aviation groups operating as neighbours; RAF Brize Norton instigated and chaired the inaugural meeting of the Oxfordshire Regional Airspace Users Working Group and has actively contributed to it since its inception. RAF Brize Norton shares the Chair of this Working Group with RAF Benson.

4.2 Engagement of Stakeholders

Following the Atkins Scoping Report published in 2012, the MOD commenced the ACP process. Since one of the project objectives was to introduce new PBN IFPs and to ensure their containment, the initial airspace design was predicated around the initial draft of the primary protection area. Visits were arranged to local aviation groups to discuss from first principles how the airspace might alter based on the initial indications of the size of the primary protections areas demanded by compliance with ICAO PANS Ops criteria.

Some of the early engagement identified that applying the full primary protection areas to IFPs (designs constrained by specific joining and leaving points and levels) would create a volume of airspace that would not be acceptable to most aviation stakeholders. Since then, RAF Brize Norton has sought to apply a principle to only adopt the minimum volume of airspace necessary to contain the IFPs to an acceptable level.

Specific visits were conducted to local aviation units to understand the particular areas of concern for each unit and type of aviation, and to take these into account wherever possible when drafting design options and potential mitigations. In addition, presentations were delivered to the Oxfordshire AIAA Working Group (subsequently renamed as the Oxfordshire Regional Airspace Users Working Group (RAUWG)). The ACP has been a standing item on the agenda and the meetings have been attended by representatives from the RAF Brize Norton ACP Project team.

4.3 Development of Airspace Design

The initial airspace design was based around containing the full primary containment areas associated with the IFPs. However, it was clear that too many other aviation organisations would be unduly affected by such a large volume of airspace, so several actions resulted:

a. The Procedure Design organisation responsible for developing the IFPs were challenged to ensure that the IFPs demanded the smallest

volume of airspace necessary by re-examining climb gradients and speed constraints.

b. The constraints placed upon the project by the joining and leaving points and levels were scrutinised.
c. The absolute minimum containment policy was applied, exposing the ADH to slightly greater project risk at the expense of minimising the full protection that the project would ideally like to achieve.
d. The risk in the sub para above was mitigated by developing a safety argument to provide evidence to show that the situation for RAF Brize Norton crews would be greatly enhanced compared to the current situation, and that the ATCOs would have greater information about conflicting traffic which in turn would provide improved situational awareness for pilots.
e. The type of airspace was challenged to ensure that the project objectives could be achieved, whilst minimising the disruption to other aviation stakeholders.

Full details of the design iteration are contained within Section 5 below.

5 What We Consulted On

5.1 Design Iteration and Constraints

5.1.1 Key Constraints

The main purpose of the project was to enhance safety to RAF Brize Norton aircraft operating outside the CTR, particularly those accessing and egressing the UK airways network. Therefore, one of the project objectives was to provide protection to the large, wide bodied transport aircraft by connecting the RAF Brize Norton CTR and the airways network with CAS. The entry and exit points from the airways network are fixed points that have been derived in coordination with the en-route Air Navigation Service Provider (ANSP) NATS En Route Limited (NERL) over many years. The airway to the south of RAF Brize Norton (Airway Q63) is very busy because it is a major route in and out of London Heathrow, and also services Bristol Airport and Cardiff Airport. The joining point allocated to RAF Brize Norton on Q63 by NERL is MALBY and the joining level is Flight Level (FL) 80, which equates to approximately 8,000 ft. The leaving point is SIREN at FL 90. The levels are designed to provide procedural separation from other aircraft joining or leaving the airway in the same area; this design mitigates against loss of the surveillance capability. Aircraft are often cleared above FL80 on first contact with London Control or by verbal coordination between RAF Brize Norton and London Control to assist with separation against unknown traffic, depending on the traffic situation already on the airway.

The joining level at MALBY dictates the volume of airspace required to contain the aircraft. A higher level would mean a steeper climb profile and would reduce the volume of airspace required at lower levels. For these reasons, RAF Brize Norton asked if the levels could be altered, but due to the complex arrangement of the London Terminal Manoeuvring Area (LTMA) and the interactions with the LAMP, the access and egress points could not be altered. This has several ramifications that include limiting the rate of climb for departures so that the aircraft remain contained within the vertical limits of CAS. This also means an increase in the volume of airspace required to contain the aircraft at lower levels, which has more of an impact on the GA community. However, agreement of the joining level at MALBY complies with the project objective to fully engage with LAMP and to review current and future SIDs and STARs to ensure they remain within the confines of the airspace submission.

5.2 Defining the Options

The RAF Brize Norton Consultation Document, published in 2017, detailed the options that were considered during the design process. For ease of reference, these included the following:

- Option 0 – Do Nothing.
- Option 1 – Do Minimal.
- Option 2 – Other Airspace Design Options including:
    - Transponder Mandatory Zone (TMZ).

    - Class E Airspace + TMZ.
    - Radio Mandatory Zone (RMZ).
- Option 3 – Minimal Change to Class D Airspace.
- Option 4 – Establish Class D Controlled Airspace comprising a CTR and CTAs to provide airways connectivity.

Analysis of the options concluded that increasing the volume of CAS, by including an extension to the existing Class D CTR and additional Class D CTAs, was the most appropriate way to provide both airways connectivity and the containment of IFPs. This was considered the optimal way for RAF Brize Norton to meet its project objectives. The Scoping Study identified that this solution would address the risk of a MAC between a RAF Brize Norton aircraft and another aircraft operating outside of the CAS. This was also the proposed solution shared with stakeholders during the public consultation.

The stakeholder engagement activities carried out ahead of the consultation highlighted the concerns of the GA community. From the GA perspective the proposal would suggest a new volume of airspace conjoined to another additional airspace proposal under a separate application by LOA. Every effort was made to keep any increase of airspace to a minimum by challenging the ICAO containment policy and the CAA containment policy and constraining aircraft speeds to reduce the radius of turn and volume of airspace required to contain the flights.

The consulted volume of airspace is shown in Figure 4 and the vertical extents of the airspace segments are listed in Table 1 below Figure 4.

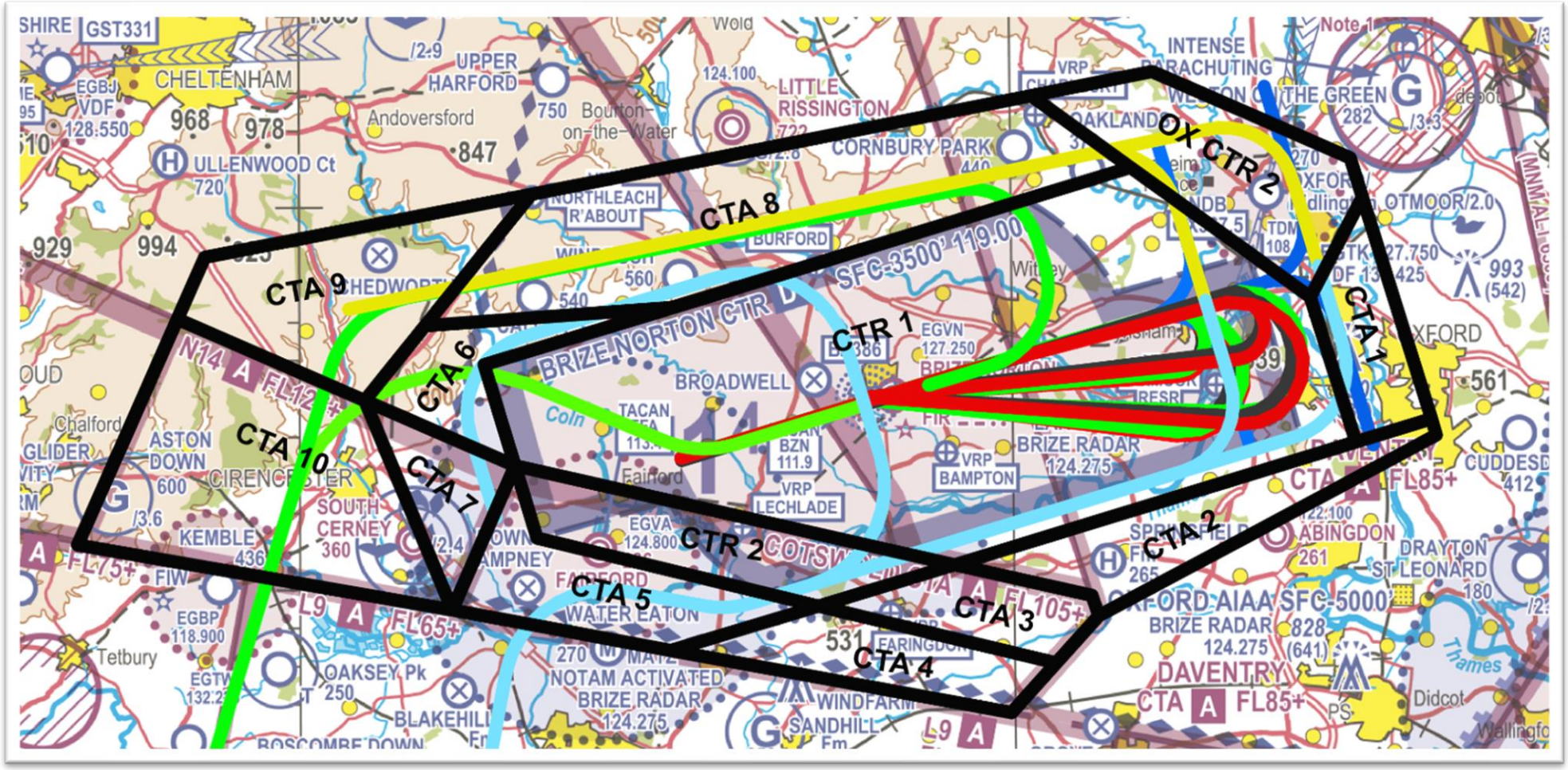


Figure 4 – Consulted Proposed RAF Brize Norton Airspace Design

Airspace Area Name	Vertical Values
CTR 1	Surface to 6,000 ft
CTR 2	Surface to FL105
OX CTR 2	Surface to 6,000 ft
CTA 1	2,000 ft to 6,000 ft
CTA 2	2,300 ft to 6,000 ft
CTA 3	3,500 ft to FL105
CTA 4	4,500 ft to FL105
CTA 5	1,800 ft to FL105
CTA 6	1,800 ft to 6,000 ft
CTA 7	1,800 ft to FL125
CTA 8	2,300 ft to 6,000 ft
CTA 9	3,500 ft to 7,000 ft
CTA 10	5,000 ft to FL125

Table 1 – Vertical Limits of Proposed Airspace

6 What the Consultation Told Us

6.1 General Response

The RAF Brize Norton ACP public consultation attracted a large volume of objections, mainly from the GA Community either as individuals or as consolidated responses through GA representative organisations. Whilst most responses considered that the volume of airspace proposed was disproportionate to the number of aircraft movements operated at RAF Brize Norton, many also criticised the process that was being used to propose the change.

6.2 Summary Breakdown of Responses

A full analysis of the responses received was published within the RAF Brize Norton Consultation Feedback Document in October 2018. As the public consultation was held concurrently with that of LOA, many consultees chose to respond to both proposals with a single email or letter. The total number of objections received were 1,597 which represented 97% of the responses. These responses were all analysed to ensure that the key themes could be captured. Whilst many were similar in nature, we separated out the objections according to the number of responses and further separated these into several tranches. The first tranche analysed those with key words within the response that attracted more than 100 responses. These are shown in Table 2 below.

Nature of Objection	Number of Responses
Reduction in safety for GA	902
Choke points	871
Disproportionate	464
Increased risk of mid-air collision	430
Impact on cross country flying	281
Cynical use of CAP 725	199
Uncompelling safety argument	173
Benefit the few over the many	134
Restriction of free flying	131

Nature of Objection	Number of Responses
No consultation with HG/PG[10]	131
Does not consider GA	122
Unjustified based on movements	117
Impact on Avon Aerotow Group	116
Increased incidence of airspace infringements	111
Impact on HG/PG	106
Designed to make airport operations easier	104
Unnecessary	103

Table 2 – Key Themes Attracting > 100 Responses

Whilst the remaining tranches attracted fewer responses, there were overlaps between those that attracted the largest number of objections.

6.3 CAP 725 Guidance

Not only does CAP 725 state within its guidance that Change Sponsors should analyse the consultation responses to understand where the key strengths of opinion lie, it also suggests that they should use the information from the consultation exercise in order to assist with its selection of the most appropriate design option it intends to submit to the CAA. Notwithstanding the guidance laid out in CAP 725 that consultation responses should be used to identify the preferred solution, RAF Brize Norton was also keen to attempt to address some of the concerns raised during public consultation and afterwards at various forums. This analysis triggered a set of actions that are detailed within Section 7.

6.4 Alternative Solutions Suggested

Whilst many responses received during the consultation objected to the proposal outright, approximately 769 responses offered an alternative solution that they would consider to be preferable to the implementation of a larger volume of Class D CAS. Within those responses, 161 suggested either a Radio Mandatory Zone (RMZ), Transponder Mandatory Zone (TMZ) or Class E airspace as an alternative to Class D. This equates to approximately 21% of those who proffered an alternative solution. Full details of the analysis are found within the RAF Brize Norton Consultation Feedback Document [Reference10].

[10] HG/PG = Hang-glider and Paraglider

6.4.1 RMZ/TMZ

If an RMZ and/or TMZ solution were to be considered, it would not alter the classification of the airspace. The airspace would be Class G, and the rules of operating within Class G would apply to pilots and ATCOs. The airspace would have to extend from the surface upwards.

6.4.2 Class E Airspace

Class E airspace is Controlled Airspace (CAS) within which different rules apply for pilots and ATCOs as far as separation responsibilities and terrain clearance responsibilities. Class E cannot extend from the surface within the UK; only Class A or Class D airspace can be used for Control Zones (CTRs) within the UK. This statement has recently been confirmed with the CAA. Therefore, if Class E were to be used, it could only be used for CTAs within the RAF Brize Norton proposal.

Within Class E airspace, IFR aircraft must be in receipt of an ATC clearance from the relevant service provider. ATCOs are responsible for ensuring separation between IFR aircraft and a Radar Control Service is provided. ATCOs are **not** responsible for ensuring separation between IFR and VFR aircraft. VFR aircraft do not require a clearance to enter Class E airspace. VFR aircraft are responsible for ensuring separation between themselves and other VFR **and** IFR aircraft. In the UK, VFR aircraft operating in Class E airspace are encouraged to request a TS from the relevant service provider so that they can be advised of other aircraft operating within their area.

Since the requirement to request a TS from the relevant service provider is not mandatory, Class E airspace alone does not provide the same degree of situational awareness over all traffic as Class D airspace would. Therefore, very little information would be available about VFR aircraft operating within the airspace. Situational awareness is required by ATCOs and pilots operating IFR and VFR in order to reduce the risk of a loss of separation or MAC with unknown traffic.

Class E provides some clear benefits over an RMZ/TMZ, for example, the same criteria for VFR flight applies within Class D and Class E CAS, and ATCOs providing an IFR service are not required to provide separation against unknown VFR traffic.

6.5 Summary

Following a full analysis of the responses received, it was agreed that some further work was necessary to investigate how the concerns raised by consultees could be mitigated whilst still delivering the full project objectives. Full details of the follow-up actions are contained within the following section.

7 What We Did in Response

7.1 General

From letters received both during and post-Consultation, and in light of other ACP applications in the south of England, it was clear that the stakeholder community that would feel the most impact of any change was the GA community. The community response was coordinated by the General Aviation Alliance (GAA) but also included amongst others, the following organisations:

- British Gliding Association (BGA)
- British Microlight Aircraft Association (BMAA)
- British Hang Gliding and Paragliding Association (BHPA)
- British Parachute Association
- Light Aircraft Association
- Helicopter Club of Great Britain
- Royal Aero Club of the United Kingdom
- European Association of Instrument Rated Pilots
- Aircraft Owners and Pilots Association (AOPA)
- The Honourable Company of Air Pilots (HCAP)

7.2 Initial Design Modification

Following consultation, RAF Brize Norton undertook a detailed analysis of the airspace design to determine where further reductions in proposed airspace volume could be accommodated without affecting the overall project objectives. Since the original designs had already challenged some of the regulatory compliances, (particularly, but not solely, the CAA Containment Policy) further alterations would increase the risk of obtaining satisfactory regulatory approval and might jeopardise an appropriate degree of physical containment.

This work was conducted during early 2018 and the volume of CTA airspace was reduced by raising the initially proposed base levels. The risks presented by reduced containment were identified and presented to the Change Sponsor, and it was felt that these could be mitigated by the development of a safety argument to support the application.

7.3 Further Stakeholder Meetings

The post-consultation revised airspace design was presented at a stakeholder engagement event in October 2018 where key representatives from the organisations listed at 7.1 and other selected stakeholders were invited. The meeting was hosted by RAF Brize Norton and the Air Officer Commanding No 2 Group was also in attendance. The revised airspace design is shown below:

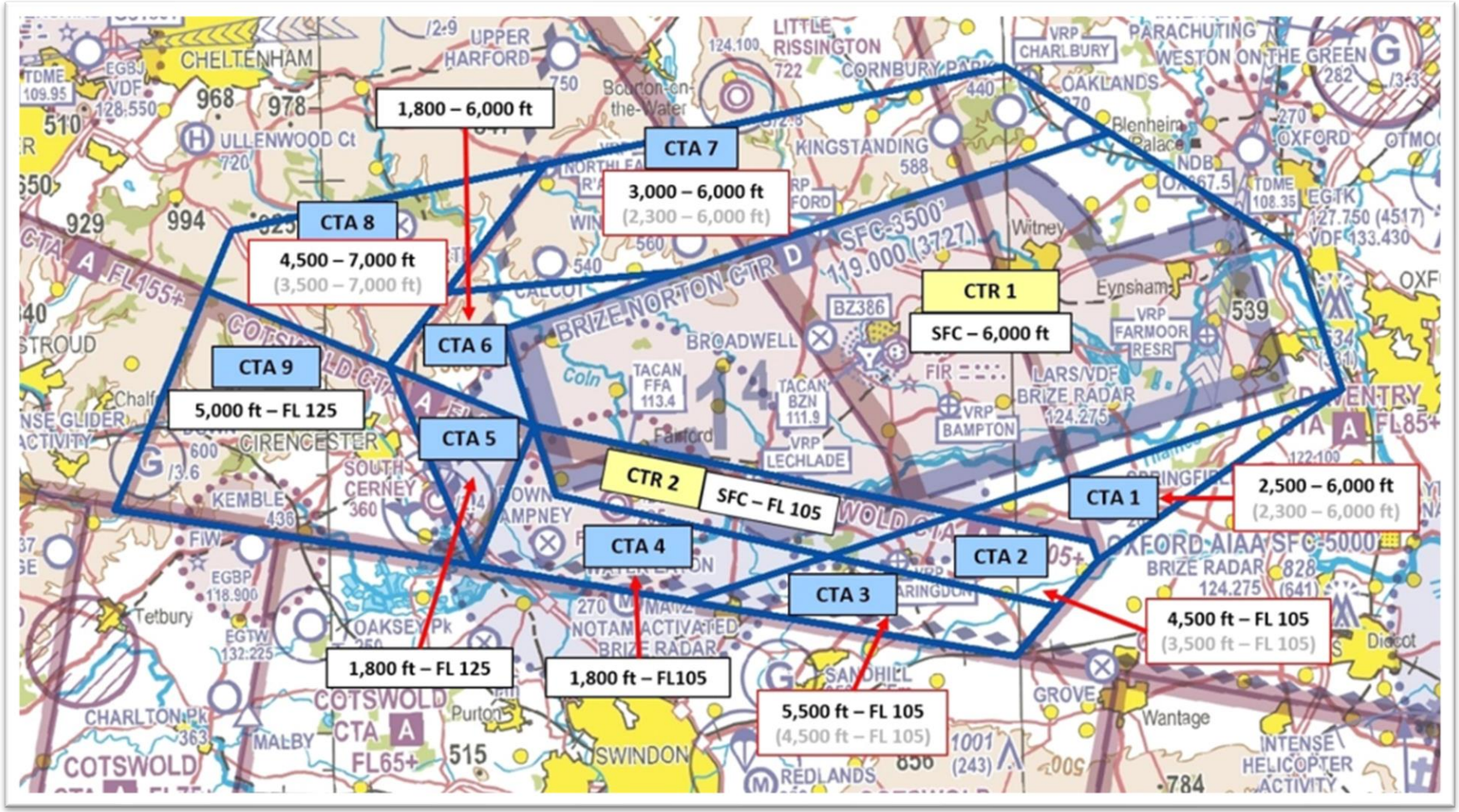


Figure 5 – Post Consultation Revised Airspace Design

Figure 5 above shows the revised CTA base level changes, with the original (consulted) levels shown in grey below the revised levels. The main areas altered were CTAs 1, 2, 3, 7 and 8. CTAs 1, 2 and 3 sought to address comments concerning funnelling of traffic and pinch-points between the RAF Benson Military Air Traffic Zone (MATZ) and the new edge of the proposed CTA.

7.4 Feedback from the Revised Design

Overall, the informal feedback received on the day from the stakeholder engagement event was positive. There was general acceptance that designing the optimum airspace that addresses all concerns would be very difficult to achieve. That said, there was certainly an appreciation that the main concerns raised during the public consultation had been listened to and at least partially addressed.

However, it was clear that there was a feeling amongst some participants that RAF Brize Norton could go further to mitigate the concerns expressed and the Station was approached directly by representatives of the GA community to see if a follow up meeting would be possible. A further meeting with key members of the General Aviation Alliance (GAA) was scheduled at RAF Brize Norton in December 2018 to discuss what further action might be possible.

7.5 Meeting with the GAA – December 2018

Lead members of the GAA met with RAF Brize Norton ACP project team in December 2018. During the meeting, the GAA challenged the criteria applied during the design process. The general opinion was that the CAS would present a challenge for some GA pilots, particularly those who were less confident about interacting with Air Traffic Control (ATC). Those pilots would seek to avoid the airspace altogether, which would add to the funnelling and pinch point areas identified during the public consultation. In addition, some members of the GA community, particularly the Gliding fraternity, would find it difficult to comply with an ATC clearance to enter the airspace, even assuming that the glider was fitted with a radio and could request a clearance in the first place.

The GAA presented the Station with a counter proposal that, in their opinion, would address the project objectives stated by RAF Brize Norton and would have minimal impact on the GA community. The GAA proposed airspace design is shown in Figure 6 below. RAF Brize Norton agreed to consider these proposals and see if any could be incorporated within the RAF Brize Norton proposed final design.

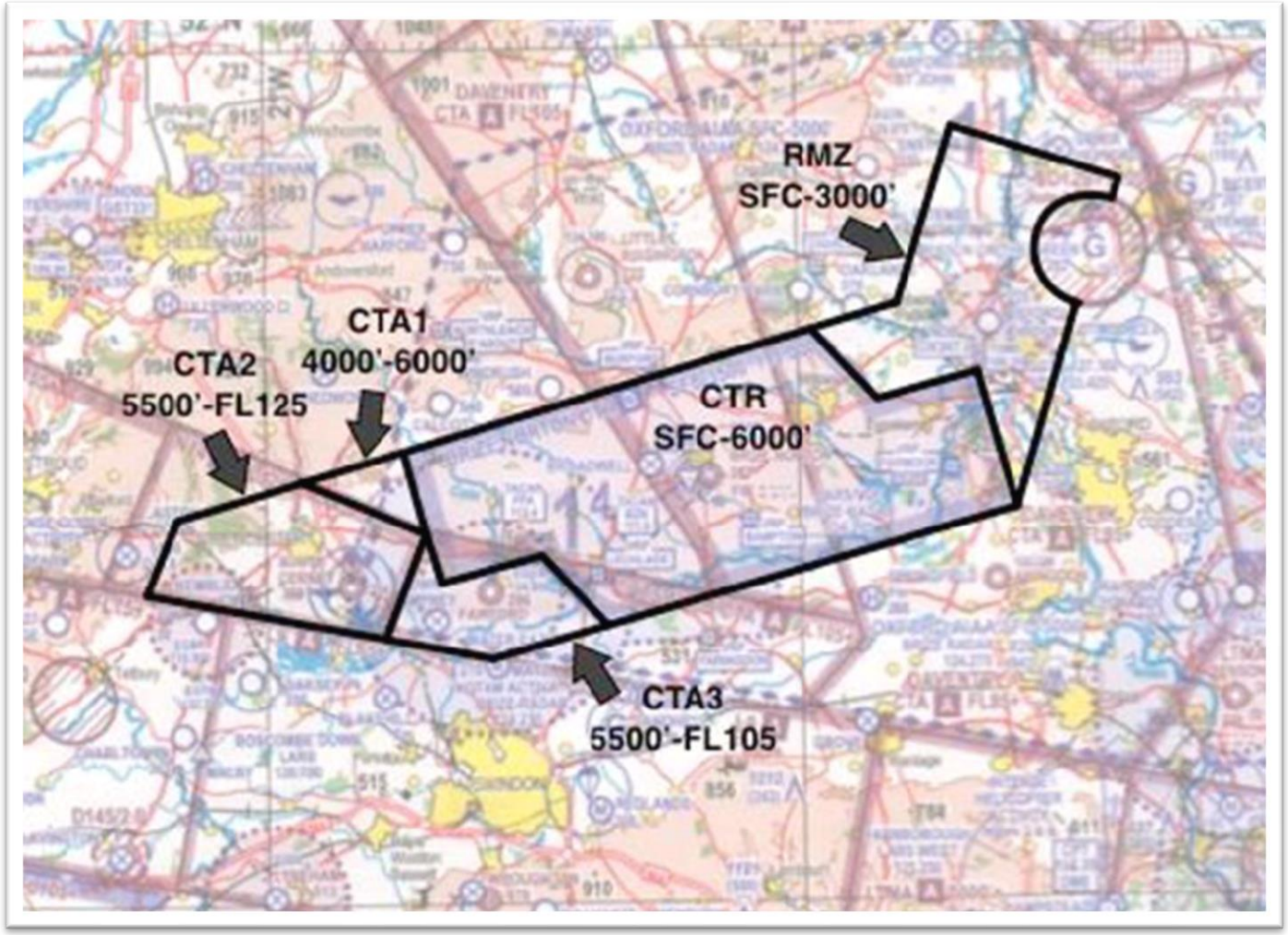


Figure 6 - GAA Proposed Airspace Design for RAF Brize Norton and London Oxford Airport, (image kindly provided by the GAA)

7.6 GAA Proposal Analysis

The Sponsor commissioned a study of the GAA proposal with regard to the project objectives and relevant civil and military regulations. This was intended to inform the extent to which any of the proposed changes could be adopted.

7.6.1 Scope

The scope of the study was a detailed gap analysis to establish whether the proposed GAA ACP design would meet the project requirements and, where it did not, what that would mean to the Change Sponsor in terms of project risk. In doing so, several areas were examined in detail:

- Compliance with ICAO PANS Ops Containment Policy
- Compliance with CAA Containment Policy
- Integration with UK Airways Network

7.6.2 Factors for Consideration

In conducting the gap analysis, the Sponsor took into account the specified project objectives which were:

- Examine the current airspace and procedures with regard to levels of risk.
- Review current and future SIDs and STARs to ensure they remain within the confines of the airspace submission.
- Identify risks associated with new design and mitigate accordingly.
- Fully engage with LAMP.
- Propose solutions to incorporate PBN procedures.
- Consider impact of Project MARSHALL.
- Consider capabilities and limitations of current and planned aircraft types.

The Sponsor also considered guidance in CAP 725 which states:

> *"The airspace structure must be of sufficient dimensions with regard to expected aircraft navigation performance and manoeuvrability to fully contain horizontal and vertical flight activity in both radar and non-radar environments."*

Finally, in addition to the scope items above, the Sponsor had to consider the very specific nature of both the military task in general and RAF Brize Norton in particular. Such considerations include, but are not limited to, the following:

- The existing conventional procedures would need to be accommodated.
- For operational training or tactical reasons, not every aircraft may be able to fly the optimum flight profile.
- There continues to be a live-flying training requirement.
- There is a need to introduce PBN procedures at RAF Brize Norton.
- As a MEDA, RAF Brize Norton's procedures and airspace must be able to accommodate a wide range of both UK and foreign military aircraft and fast-jet aircraft in distress.

7.6.3 Consideration of Base Levels of Adjoining Airspace

The proposed airspace from the GAA has two adjoining areas of airspace that only overlap with the neighbouring airspace portion by 500 ft vertically; this is between CTA 3 and the CTR and between CTA 2 and CTA 1. These areas would provide connectivity with the airways network and would be used by aircraft arrivals and departures to and from the airway.

To remain within controlled airspace and keep equally clear vertically of the boundaries, an aircraft would have to fly at 5,750ft. UK policy states that a minimum of 500ft vertical clearance is required. However, in some cases, 500ft may be insufficient when considering the risk of triggering ACAS RA, particularly for descending/climbing elements of procedures. The GAA proposal only made provision for 250ft clearance.

Having a greater vertical overlap between airspace sections allows for some flexibility in climb and descent. The aircraft can cross the boundary at a range of altitudes giving flexibility for different descent /climb rates. This can be specified on the route and automatically flown on the Flight Management System (FMS) or Flight Management Computer (FMC). If only one very specific level can be used to cross the airspace at these boundaries, then the aircraft must be flying level as it crosses. To ensure that this happens, the aircraft would need to be level some time before the boundary, especially when considering the potential risk of ACAS alerts between aircraft descending/climbing within the CAS, and other aircraft operating outside the confines of the CAS, which could be less than 300ft below/above. The degree of vertical overlap provided by the GAA proposed airspace design is depicted within Figure 7 shown below:

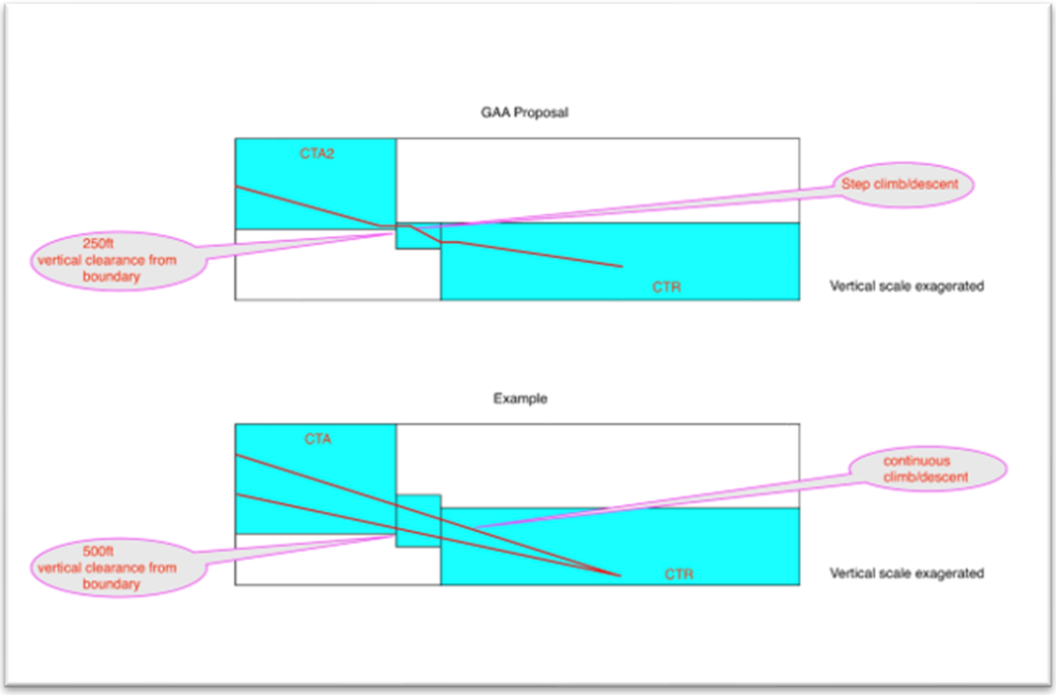


Figure 7 - Vertical Representation of Airspace Overlaps and Aircraft Paths in GAA ACP Design

It was therefore concluded that the GAA proposal could not be adopted for the following reasons:

- It does not comply with UK policy on vertical containment; this would have resulted in a significant project risk.
- It prevents continuous climb/descent profiles as aircraft would be required to level off as they transit from one airspace block to the next.
- It would require very specific flight performance characteristics which not every aircraft may be able to comply with.
- It would place an unacceptable burden on aircraft diverting to RAF Brize Norton as the MEDA.

7.6.4 Airways Network Connectivity

A significant constraint of the project, as mentioned within Section 5.1, is the rigidity of the entry and exit points for aircraft joining the airways network. Aircraft joining the airways network at MALBY must be at FL80; aircraft leave the network via SIREN at FL 90. In accordance with the project objectives, the Sponsor has accepted this constraint as it is reflected in plans to modernise UK airspace (previously known as LAMP) and it accommodates the requirements of several other airspace stakeholder communities.

The GAA proposed airspace only provides connectivity with the airways network at MALBY. This would mean that to be contained within CAS, aircraft would be compelled to use the same point to join and leave the airways network. This would place severe constraints on the flow of air operations at RAF Brize Norton. Essentially if an aircraft had been pre-noted to arrive via MALBY at a specific time, no aircraft could get airborne expecting to join airways (at MALBY) until the inbound aircraft had either landed or had been vectored clear of the other aircraft. This would not only affect RAF Brize Norton operations, but would place restrictions on neighbouring Gloucestershire Airport, Cotswold (Kemble) Airport and LOA. Further, it would place severe restrictions on the flexibility of the en-route ATC system; NATS Sector 23 manages the airways joiners and leavers for RAF Brize Norton, RAF Fairford, Cotswold (Kemble) Airport, Gloucestershire Airport, Bristol Airport and LOA.

7.6.5 Compliance with Containment Policies

The GAA also proposed IFPs that they considered would be contained within their proposed ACP design. No waypoints were provided, and no design reports were submitted so it is not clear if they were designed with the same project constraints that influenced the design produced by the RAF Brize Norton ACP Project Team.

Nonetheless, even if they were deemed to be acceptable, they did not meet the CAA's Airspace Containment Policy criteria. This applied to almost all the procedure nominal paths. Nor did the GAA proposed airspace address the current existing IFP non-compliances regarding containment, which was one of the issues that the project aimed to address.

7.6.6 Airborne Collision Avoidance System Considerations

ACAS utilises descent and climb profiles within their algorithms to assess the risk of a collision. The smaller volume of airspace proposed by the GAA, combined with the steeper gradients that would be required to remain within the airspace, mean that aircraft within the CAS would fly closer to the edge and could potentially trigger ACAS RA alerts. Remaining within the confines of the CAS would rely heavily on controller radar vectoring; aircraft flying autonomous approaches such as the new RNAV approaches or NDB approaches may be less

likely to remain within the lateral and vertical limits of the airspace. This does not address the issue of the current IFPs not being fully contained.

7.6.7 Conclusion

Having considered the proposal put forward by the GAA in full, RAF Brize Norton felt they could not proceed with their design for the following reasons:

- It did not meet CAA policy on vertical containment.
- It did not meet CAA policy on lateral containment of both new and existing procedures.
- It did not comply with the design constraint for traffic joining and leaving the en-route structure.
- It required aircraft to fly profiles which may not be possible for all aircraft operating to and from RAF Brize Norton.

That said, while the proposed changes could not be accommodated, the Change Sponsor recognised the concerns expressed on behalf of the GAA community that they represented. The Sponsor therefore directed that other options should be re-examined to ameliorate some of the perceived impacts of the increase in volume of airspace.

7.7 Final Design Review

The Change Sponsor set out to re-examine some of the previously discarded options that would still meet the stated project objectives and mitigate some of the concerns of the GAA. The first analysis conducted examined the volume of the required airspace; the second aspect considered was the classification of airspace required.

7.7.1 Airspace Design Review

RAF Brize Norton currently has a Class D CTR. The consulted proposal was to increase the size of the CTR and add additional Class D CTAs to provide connectivity to the airways network. Class D airspace provides a known environment in that aircraft can only enter the airspace with a positive clearance from ATC. One of the key stakeholders in the consultation was NATS. NATS Controllers working Sector 23 (S23) are responsible for aircraft on Airway Q63. They initially objected to the proposed expansion of Class D airspace, as they have agreements in place with Bristol Airport whereby traffic is released early. The Class D airspace belonging to RAF Brize Norton would mean that any releases would need to be coordinated with the airspace owner first. Through discussion, RAF Brize Norton has agreed to develop a Special Instruction (SI) that provides details of airspace sharing arrangements for the Class D airspace above 6,000 ft with NATS, which would allow NATS S23 autonomous use of the airspace up to the Class A airway. The full details will be confirmed as part of the transition arrangements.

As part of this final airspace design review, the vertical and lateral dimensions of Class D airspace were reduced to the absolute minimum required. Nevertheless, the reductions to the volumes of airspace were considered essential to address the objections of the GA community, also a key stakeholder.

RAF Brize Norton agreed that the Long procedure would only be used after coordination with LOA due to the impact on departing traffic and visual circuit traffic. In addition, RAF Brize Norton recognised that the volume of airspace required to fully contain the Long procedure was unacceptable. Therefore, it was agreed that the default procedure for arrivals to Runway 25 would be the Short procedure which has a slightly shorter final approach and therefore demands less airspace to provide containment. Containment of the Short procedure can be achieved by the expansion to the south of the CTR, allowing a wider pattern and a longer base-leg section than is currently permitted by the existing CTR. Whilst this decision could deny RAF Brize Norton a degree of operational flexibility, it was recognised that removing the containment of the Long procedure would mean that the CTR eastern boundary would remain consistent with the existing CTR boundary.

7.8 Airspace Classification Review

The Change Sponsor then examined whether Class D airspace was necessary to achieve the stated project objectives. A study was conducted to see if alternative airspace classifications could be considered that might have less of an impact on the GA community. These included:

1. RMZ/TMZ
2. Class E
3. Class E plus conspicuity
4. Combined Class D and Class E+

7.8.1 RMZ/TMZ

The introduction of an RMZ/TMZ adjacent to the existing Class D CTR would introduce different rules and responsibilities for ATCOs and aviators. An RMZ/TMZ would be Class G (uncontrolled airspace) with different rules associated with terrain clearance, visibility minima for VFR and ATC service provision.

One of the stated objectives of this project, which originated from the initial safety assessment, is that current and future SIDs and STARs should remain within the confines of the airspace submission. An RMZ/TMZ does not in itself change the airspace classification and provides little additional protection to RAF Brize Norton's SIDS and STARs because other aircraft do not require permission to enter such zones. Whilst a RMZ/TMZ would increase controller situational awareness, it also increases complexity as ATC services would change for IFR aircraft, as they leave the CTR and change again as the aircraft enters Class D prior to joining airways at MALBY.

In addition, an RMZ/TMZ does not meet the requirements of NERL which resulted in an initial objection to the original airspace proposal at consultation. Aircraft departing from aerodromes within CAS are issued a clearance to the destination prior to departure if the flight is expected to remain within CAS for the duration. The RMZ/TMZ would not constitute CAS, and therefore aircraft requesting to join the airways structure would require an ATC clearance from NATS S23 in the same way they do at present. For these reasons, this option was not taken forward.

7.8.2 Class E Airspace

Class E airspace is controlled airspace within which IFR aircraft must be in receipt of an ATC clearance, but aircraft can enter VFR without a clearance. ATCOs are only required to maintain separation between IFR aircraft; VFR aircraft must avoid IFR aircraft. It has recently been confirmed with the CAA that Class E cannot be used for CTRs within the UK. Therefore, the CTR would remain Class D, but the CTAs could be Class E.

This scenario is less complex than the previous RMZ/TMZ scenario as the same rules regarding visibility minima for VFR flying and terrain clearance apply equally within Class E and Class D. Class E is also CAS, so aircraft departing RAF Brize Norton to join the airways network would be issued the ATC clearance prior to departure.

Whilst this option reduces risk between IFR/IFR and IFR/VFR aircraft because it places additional responsibilities on the pilot, it does not provide the required degree of confidence required by RAF Brize Norton regarding the status of conflicting aircraft. It is considered that the risks associated with an inadvertent penetration of Class E airspace are not only unresolved but potentially increased because a controller might incorrectly assume that such aircraft are VFR and therefore, in accordance with the rules of Class E, accept that they are responsible for separation against IFR traffic.

Therefore, while a Class E solution is an improvement on RMZ/TMZ, Class E airspace does not result in the reduction in risk that the Change Sponsor requires. Although the level of risk can be identified, the mitigation is more challenging since Class E alone does not provide sufficient situational awareness to mitigate the risk of a MAC of a RAF Brize Norton aircraft with another aircraft.

Finally, in the UK, Class E is traditionally more suitable for areas with less dense levels of traffic density; the Oxfordshire Area of Intense Air Activity is not such an area.

7.8.3 Class E plus Conspicuity

Whilst Class E airspace alone does not meet the stated project objectives, a combination of Class E plus an element of conspicuity would have the following advantages:

- The Class E element would:
  - Allow separation to be maintained between IFR aircraft.
  - Ensure separation is maintained between VFR and IFR aircraft.
- The Conspicuity (TMZ/RMZ) element would:
  - Provide a ‘known’ traffic environment in the vicinity of RAF Brize Norton without impinging on airspace users’ freedom to operate.
  - Provide the required degree of assurance that conflicting aircraft are operating in accordance with Class E airspace regulations.
  - Provide airspace users with maximum opportunity to access airspace (i.e. compliance with either the TMZ or the RMZ requirements).
  - Still make provision for airspace users that cannot comply with either the TMZ or the RMZ requirements.

Conspicuity could be provided by either an aircraft displaying a Mode 3A Transponder together with Mode C altitude information, or by non-transponder

equipped aircraft calling the ATC unit to provide altitude and route information ahead of entering the airspace. Aircraft flying VFR do not need an ATC clearance to enter the airspace. However, when an ATCO is able to contact VFR aircraft to ascertain their intentions, this ensures ATCOs have full situational awareness when providing traffic information to IFR aircraft. Whilst this scenario has merit, it is likely that NATS might object since it does not provide the same degree of known traffic environment when Class D airspace abuts the Class A airway.

7.8.4 A Combination of Class D and Class E plus Conspicuity

The option to consider Class E airspace plus conspicuity accomplished most, but not all, of the project objectives. However, a combination of Class D and Class E plus conspicuity could satisfy both the Change Sponsor's objectives and the requirements of two key, but potentially competing stakeholders: NATS and the GA community. In order to remove their objection, NATS required the certainty and flexibility provided by Class D for airspace abutting Class A. By contrast, the GA community objected to Class D airspace on the grounds of its perceived impact on other airspace users.

The Change Sponsor considered that the airspace that lies immediately below the Class A airways could remain Class D, but any other CTAs that did not adjoin the Class A could be re-classified as Class E plus conspicuity. Although this concept has yet to be implemented within the UK, it represents a pragmatic compromise between RAF Brize Norton retaining full situational awareness of air traffic whilst allowing access to GA (or other VFR aircraft) with minimal impact.

An airspace design that incorporates these elements was completed and presented to the GA at a further stakeholder event held at RAF Brize Norton in September 2019. The design shown at

Figure 8 below was presented at this event.

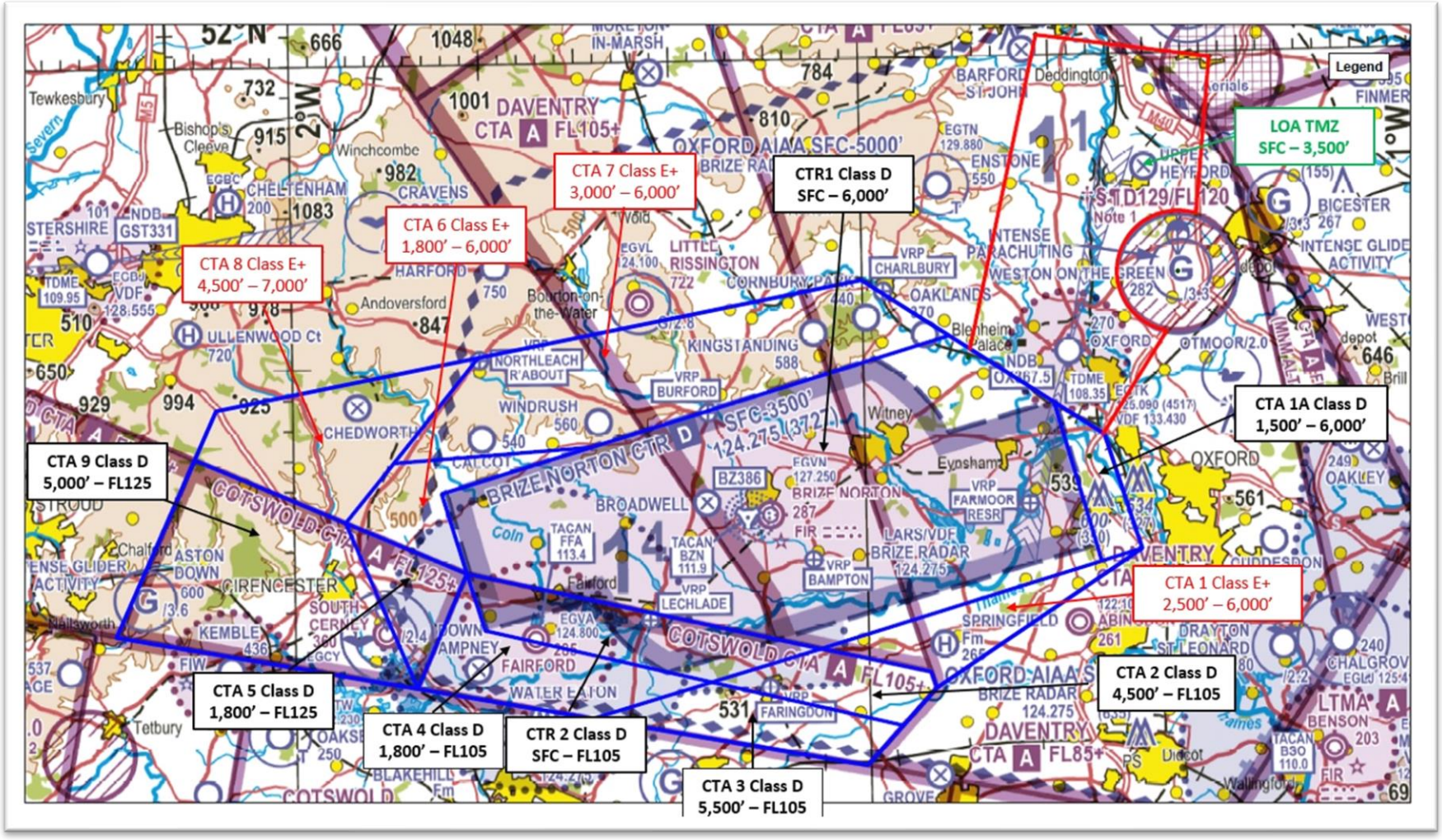


Figure 8 - RAF Brize Norton Combined Class D and Class E+ Airspace Design

7.9 Stakeholder Engagement Meeting – 17 September 2019

RAF Brize Norton hosted a second post consultation stakeholder engagement event to present the combined Class D and Class E plus conspicuity design. Overall, the reception was warm, and the general opinion was that the Change Sponsor had worked hard to mitigate the concerns of other airspace users. There were questions regarding how Class E with added conspicuity might work, but once it was explained that conspicuity could be provided by **either** a transponder **or** a radio call, most of those present could see the merits of the compromise.

Inevitably there were some concerns from some of the GA community, notably the BGA, whose members often have neither a radio nor a transponder due to the power requirements. The Change Sponsor has offered to establish agreements with local and national BGA representatives so that their activities can still access the airspace in a safe and collaborative manner if required.

7.10 Further GAA Engagement – 22 November 2019

The GAA requested a further meeting with the ACP Team and the Change Sponsor hosted this on 22 November 2019. At this meeting it was made clear that the Class E plus conspicuity was the final design that will be submitted to the CAA. The GAA requested further amplification on the rationale behind certain CTAs and explained the challenges that VFR aircraft might have. The Change Sponsor agreed to provide further detail and that work was completed in February 2020. In addition, RAF Brize Norton agreed to consider reducing the volume of Class D airspace and increasing the volume of Class E + conspicuity by horizontally splitting the airspace. This would allow the airspace immediately adjoining the Class A airspace of Q63 to remain as Class D, whilst the lower levels which have the most impact on the GA community would be Class E+.

7.11 Follow Up Actions

The enhanced stakeholder engagement has strongly influenced the design modifications that RAF Brize Norton has made to its proposal. This has meant that a proportionate volume of airspace has been requested, and the use of Class E+ conspicuity in the main areas used by the GA community means that access without an ATC clearance is possible. The final proposed and agreed design is detailed within Section 10.

7.12 Summary

Section 4.13 of CAP 725 states that:

> "*It is not envisaged, nor expected, that consultation becomes a never-ending process of consult-modify-consult. At the point at which the Change Sponsor considers that issues raised have been accommodated, to the extent possible, then the Proposal should be submitted to SARG who will be the arbiter of whether the Change Sponsor has acted 'reasonably' in meeting the needs of stakeholders.*"

Nonetheless, following stakeholder feedback from consultation, the Sponsor has felt that the strength of feeling expressed and the constructive manner with which stakeholders have engaged warranted ongoing engagement during the

development of the proposed airspace design. The Sponsor has made every effort, at all times, to be transparent and open both on their proposals and the degree of change which they could accept. This has resulted in a final airspace design which differs from that presented at consultation in a number of areas, not least airspace classification.

It should be stated that, from the outset, the Sponsor's preference has been for Class D airspace as it provides the required degree of protection for operations at RAF Brize Norton and fulfils all the project objectives. That said, the Sponsor equally recognised that a degree of compromise was required on all sides, to reach an equitable solution and meet the project objectives.

The final proposed airspace design includes an element of Class D airspace to satisfy the objection of NATS concerning aircraft entering and leaving the en-route structure; however, the Sponsor has been able to reduce the vertical and lateral limits of such airspace to the minimum required.

The Sponsor equally recognised the strong objection of the GA community to Class D airspace and has accepted the reduced, but tolerable protection provided by Class E airspace. However, the effectiveness and assurance provided by such airspace is only achieved when combined with a TMZ/RMZ; that is to say compliance with either the TMZ requirements or the RMZ requirements. The Sponsor also recognises it is their responsibility to also accommodate airspace users who cannot comply with the requirements of either a TMZ or RMZ design.

The Sponsor therefore believes that, though protracted, the consultation phase as laid down in CAP 725 has been effective and has helped broker a final airspace design which adequately addresses the feedback received from a range of potentially competing stakeholders. It also fulfils all project objectives:

- Examine the current airspace and procedures with regard to levels of risk.
- Review current and future SIDs and STARs to ensure they remain within the confines of the airspace submission.
- Identify risks associated with new design and mitigate accordingly.
- Fully engage with London airspace modernisation project.
- Propose solutions to incorporate PBN procedures.
- Consider impact of Project MARSHALL.
- Consider capabilities and limitations of current and planned aircraft types.

It should be noted that these objectives have been fulfilled but not in the manner originally anticipated by the Sponsor in this CAP 725 project. We see this as a positive indication of the effectiveness of the process employed and our willingness to go above and beyond the CAP 725 process to identify a compromise solution.

8 Integration of RAF Brize Norton and London Oxford Airport ACPs

8.1 Overview

From the outset of the project, any proposed changes to the RAF Brize Norton airspace or procedures needed to be considered carefully for their impact on operations at neighbouring LOA (Kidlington). In June 2015, LOA attended a Framework Briefing at the CAA to state the requirement for enhanced airspace measures around its final approach to the main instrument runway. At this point, LOA was unaware of the full details of the RAF Brize Norton intentions, and the CAA insisted that if both airports were seeking to alter their arrangements, they should do so collaboratively. Both projects were consequently managed concurrently; both public consultations took place concurrently and each airport ensured that any website material also included mention and links to the other airport's intentions and designs. That said, it was also recognised that the respective airspace proposals should not be reliant on each other for success.

8.2 Potential Areas to be Addressed

8.2.1 Procedure Containment at RAF Brize Norton

The relative positions of each airport's runways have meant that both airports must frequently and closely cooperate and coordinate with each other. The main instrument runway for LOA is Runway 19; this means that arrivals are from the north and therefore do not usually conflict with aircraft arriving or departing RAF Brize Norton. However, departures from Runway 19 are given instructions to ensure they remain outside of RAF Brize Norton CAS, and if RAF Brize Norton aircraft remain inside the CAS, separation is deemed to exist. However, as explained within Section 3.2, the current CAS does not fully contain the existing RAF Brize Norton procedures. This means that aircraft arriving via Runway 25 often extend beyond the eastern boundary of CAS, which brings them into confliction with either LOA aircraft (particularly departures) or other traffic operating outside the CAS. This is particularly the case for pilot interpreted approaches such as Non-Directional Beacon (NDB) or Tactical Air Navigation (TACAN) approaches. This means that the ATCO must either break the aircraft off from its approach to ensure that the aircraft remains within the CAS or must pass an avoiding action instruction to the aircraft to ensure that separation is maintained.

Pilots at RAF Brize Norton are required to maintain currency in NDB and TACAN approaches. Although NDB is becoming outdated in the UK, it is often still used in less developed areas of the world, in places that the military may still be required to fly.

8.2.2 How We Sought to Address the Issues

Firstly, the extension of the CTR to the south allows wider patterns to be flown by aircraft whilst remaining within the CAS. This means that aircraft can be turned

on to the final approach closer to touchdown than previously, as the base-leg segment is longer and requires a less acute turn on to finals. The initial designs included the extension of the CTR to the east with the further addition of a small hanging Class D CTA which was designed to ensure that there is a higher likelihood of aircraft remaining within the CAS. Whilst this would ensure that RAF Brize Norton aircraft would remain inside CAS when positioning from base-leg to finals for Runway 25, this option had a significant impact on LOA operations: aircraft departing Runway 19 would fly immediately into the CAS requiring standard separation criteria to be enforced. Whilst planned departures could be the subject of a coordination agreement between RAF Brize Norton and LOA, any unplanned departures, such as aircraft executing an unplanned Missed Approach Procedure (MAP) would also enter CAS immediately.

This scenario has been resolved by maintaining the eastern boundary of the existing CTR. Additional 'containment' will be provided by a volume of airspace that will be Class G but designated as RMZ/TMZ. It will be from the surface up to 6,000 ft (consistent with the proposed RAF Brize Norton CTR) and will be part of the RAF Brize Norton submission. A Concept of Operations (CONOPS) will be drawn up and will form part of the Letter of Agreement between the two airports as to how this airspace will be managed on a day-to day basis.

RAF Brize Norton aircraft still have a requirement to be able to practice longer procedures i.e. out to a final approach of around 10 nm. However, it was accepted that the volume of airspace required to contain these longer procedures would be unacceptable, and therefore, if these procedures are flown, they will be outside of CAS, and the type of ATC service offered outside of CAS will be changed to a Deconfliction Service (DS) or Traffic Service (TS). They would also be subject to close co-ordination with, and approval by, LOA.

The default procedure will be the Short procedure; if RAF Brize Norton aircraft request the Long procedure, RAF Brize Norton ATC will coordinate with LOA ATC to ensure that they do not have any departures that may be affected. In order to reduce the volume of CAS in the ACP, RAF Brize Norton has agreed to manage the risk of aircraft choosing to fly the Long procedure outside of the CAS and the RMZ/TMZ.

When LOA is operating on Runway 19, the RAF Brize Norton Short procedure and LOA procedures have been designed (including the MAP) to ensure as much lateral separation as possible exists between aircraft whilst also protecting all procedures within Class D or RMZ/TMZ airspace. This separation can be seen in Figure 9 below.

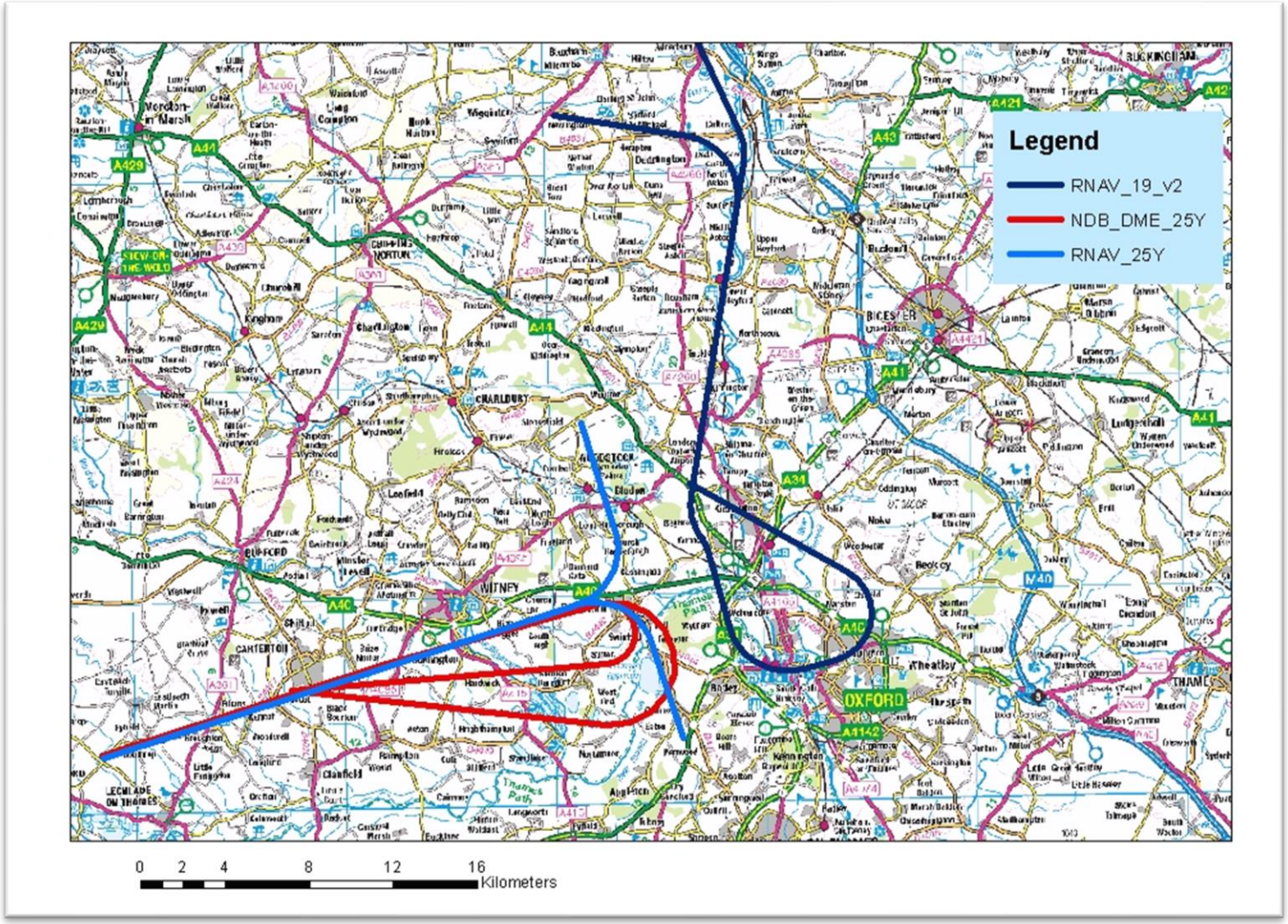


Figure 9 - BZN Short Procedure vs LOA Runway 19 Interaction

8.2.3 RAF Brize Norton Long Procedure

Figure 10 below shows the interaction between the proposed RAF Brize Norton Long procedure and the proposed LOA Runway 01 RNAV (GNSS) approach. As can be seen, the LOA Runway 01 procedure and the RAF Brize Norton conventional NDB procedure overlap. Similarly, the proposed RAF Brize Norton RNAV approach to Runway 25 also overlap with the proposed LOA Runway 01 final approach. LOA and RAF Brize Norton have agreed the principles necessary to underpin the further development of a robust set of procedures (or CONOPs) that will be implemented through a covering Letter of Agreement. These CONOPS will ensure that each airport is clear about who will have primacy if there is a conflict between arriving aircraft, how coordination procedures are to be agreed, and how standard separation minima will be achieved.

It can also be seen in Figure 11 that the RAF Brize Norton Long procedure (conventional and RNAV arrivals) also overlap with the LOA Runway 19 MAP. The same arrangements discussed in paragraph 8.2.2 above also apply in this situation.

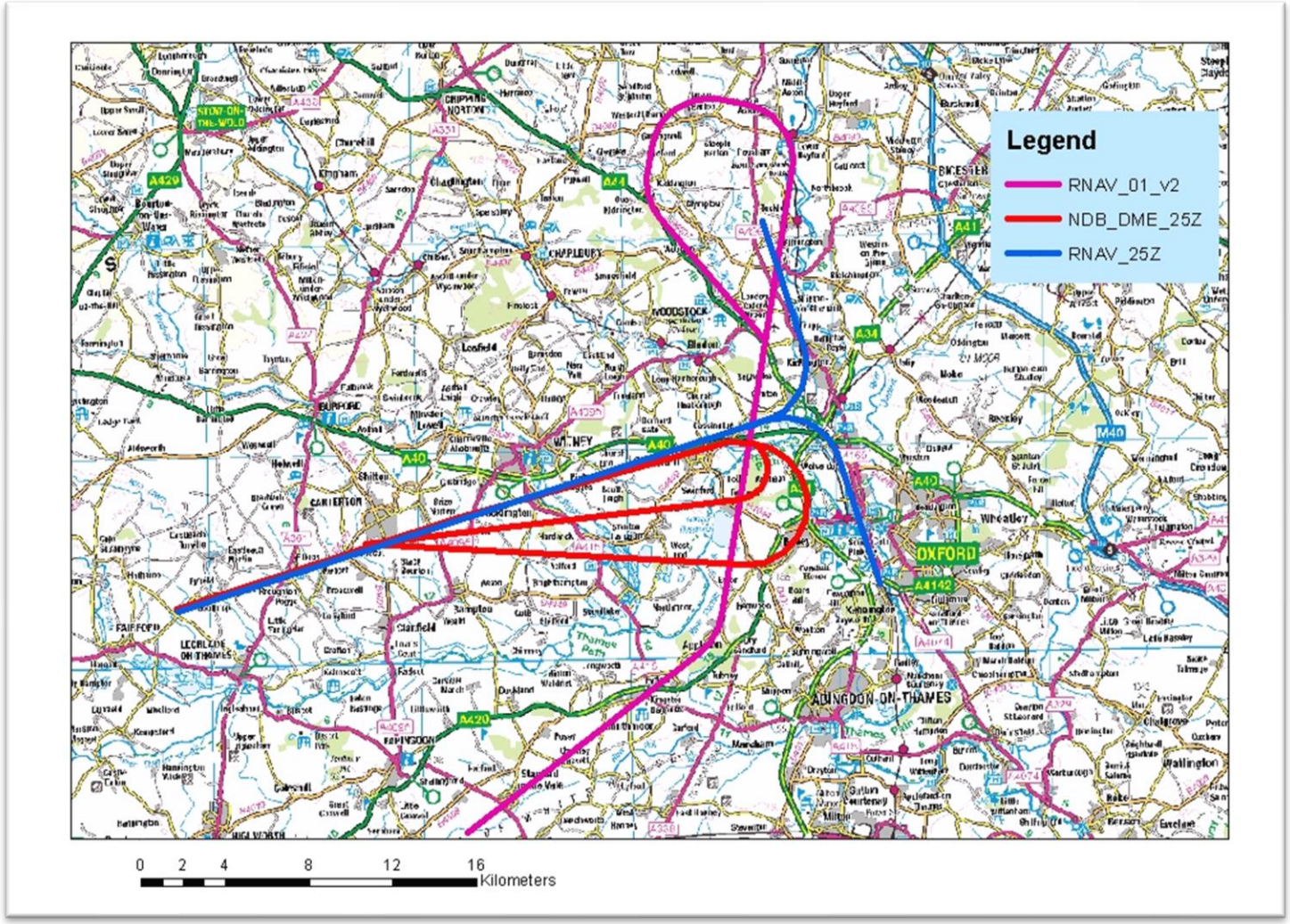


Figure 10 - BZN Long Procedure vs LOA Runway 01 Interaction

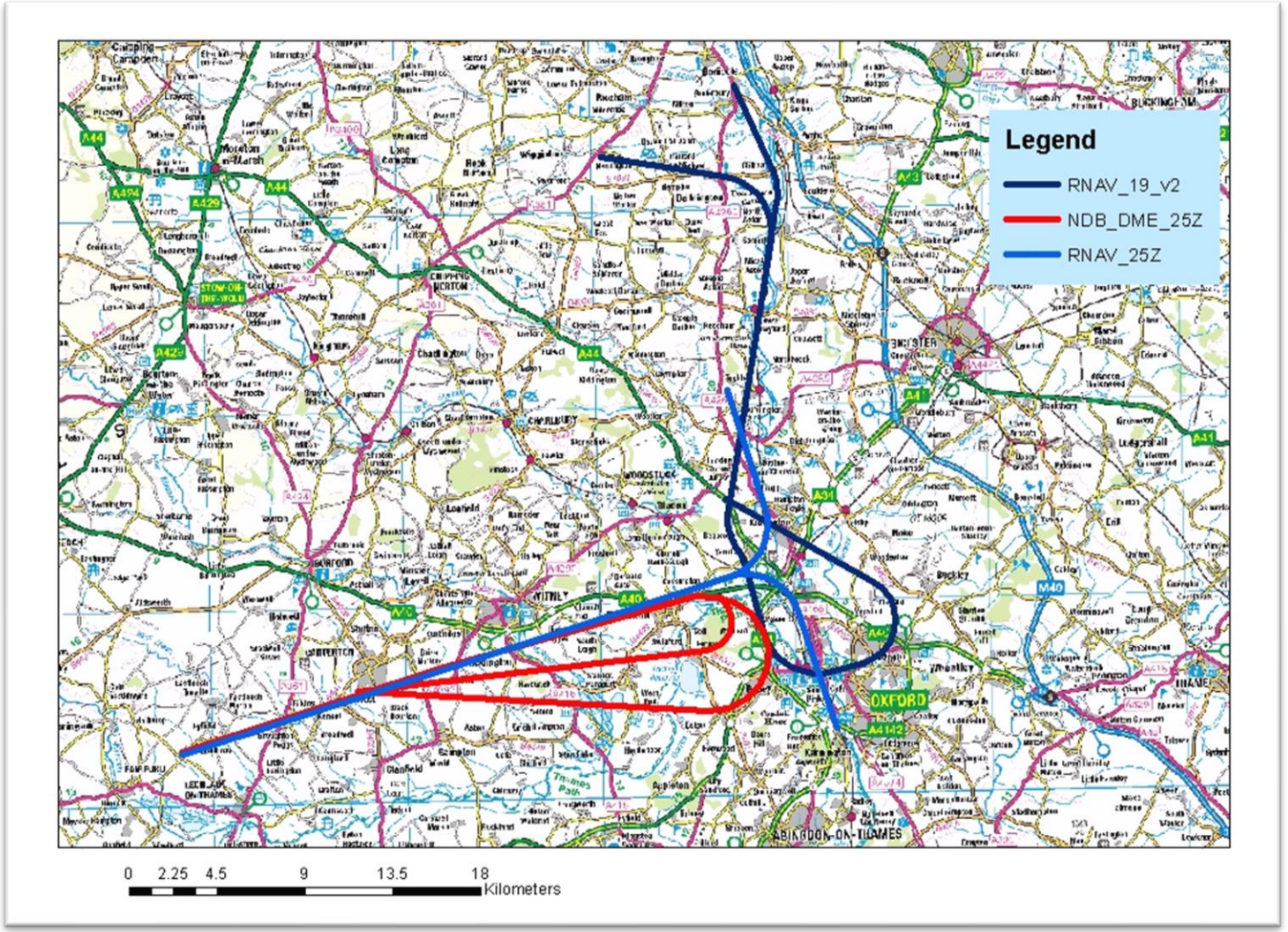


Figure 11 – RAF Brize Norton Long Procedure vs LOA Runway 19 Interaction

8.3 The LOA Airspace Solution

The initial proposal for LOA was to have airspace that would be classified as Class D to enable the provision of a Radar Control Deconfliction Service to all aircraft operating within the LOA CTA/CTR. The basic rules within this airspace volume are:

- All traffic requires clearance from ATC to enter controlled airspace thus creating a known environment to support the safe provision of Air Traffic Services (ATS).
- Instrument Flight Rules (IFR) traffic is separated from other IFR traffic and receives traffic information in respect of Visual Flight Rules (VFR) traffic.
- VFR traffic receives traffic information in respect of all other flights.

It should be noted that other airspace users would not be prevented from entering the airspace. The intention is to improve safety in an area widely acknowledged to be congested. All aircraft can use a radio to gain access and transit the area, remaining compliant with the standard ATC rules. Those aircraft that are not radio equipped can gain access to the area by prior arrangement if required. These structures and procedures will ensure a managed and safe operating environment for all.

The proposed airspace was originally intended to contain the new proposed RNAV (GNSS) procedures with Class D CAS from north only; any containment provided by the RAF Brize Norton proposed airspace to the south was not as a design feature of the LOA proposal.

However, the public consultation for the LOA airspace and procedures garnered a similar response to that of RAF Brize Norton. Indeed, it was the combined impact of both ACPs, if successful, that drove the objection by many in the GA community. In particular, the gliding community felt that this combined effect would have a considerable impact on their operations.

Following analysis of the consultation feedback, LOA also reconsidered their design and sought to meet their project objectives by an alternative means that would also have less impact on the GA community. The result was that a Transponder Mandatory Zone extending from the surface up to 3,500 ft would protect IFR arrivals from the north. Full details of the LOA proposal can be found on the CAA website.

9 Operational Impact

9.1 Overview

The operational impact on neighbouring LOA has been discussed in full detail in Section 8. This section will seek to address the overall operational impact on RAF Brize Norton and on other neighbouring aerodromes and ANSPs should the ACP be successful.

9.2 Hours of Operation

As a Military Emergency Diversion Aerodrome (MEDA) RAF Brize Norton is operational 24 hrs per day, 7 days per week. There is no plan to change the hours of operation as a result of this ACP.

9.3 Traffic Data

This ACP is not about increased use of RAF Brize Norton or to protect future growth potential. The aim is to address safety risks that were identified by an independent safety study, and to meet the project objectives identified by the MOD. The airport is the largest of the RAF's bases and is the only MEDA that could be used by any military aircraft (UK based or foreign) in the event of an emergency.

9.4 Analysis of Impact of Traffic Mix and Complexity and Workload of Operations

This proposal aims to enhance safety by providing containment to those aircraft joining/leaving the UK airways network. This will reduce the workload on pilots and ATCOs as the aircraft will be operating within a known traffic environment which reduces the need for avoiding action. Aircraft will also be flying more prescribed and predictable routes, thereby removing the requirement for controller intervention both at RAF Brize Norton and NATS. This in turn increases ATCO capacity which may be required to service the additional airspace. The revised IFP designs and the introduction of the 'Short' procedures for RW 25 means that aircraft are more likely to remain within the CAS; this reduces the requirement for coordination and in some cases, the late avoiding action that has been required to ensure separation against LOA aircraft.

The current requirement to coordinate traffic in an unknown traffic environment is reactive in nature, inefficient and uses a great deal of ATCO capacity. More effectively separating aircraft through the design of the new procedures and airspace will be safer for aircraft on the approach and following departure from either airfield, and aircraft transiting the new airspace structures. This solution will increase the efficiency of aircraft operations into and out of both airports, whilst at the same time releasing controller capacity to manage aircraft requesting permission to cross the areas concerned.

9.5 Interaction with En-Route Structure

One of the stated project objectives was for the new airspace design to provide connectivity to the UK airways network. This has meant that NATS has been informed as a key stakeholder in the iterative designs that have been developed. The purpose of the airspace is to ensure that aircraft, often troop-carrying aircraft, are afforded the same degree of protection accessing and egressing the airways network as fare paying passengers.

As mentioned in within Section 7.7.1, discussions have been held with NATS S23 about developing an airspace sharing arrangement whereby the airspace adjacent to the Class A can be used by NATS S23 autonomously. This reduces the requirement for verbal coordination between RAF Brize Norton and allows existing operational practices within NATS to continue. It is proposed that the Class D airspace above 6,000ft will be the subject of the agreement. This will be finalised within a Letter of Agreement; a copy of the agreement in principle will be submitted with this proposal.

9.6 Impact on Other Local Aerodromes

The following sections describe RAF Brize Norton's understanding of the potential impacts of the proposal on other local aerodromes. The aerodromes are shown in Figure 12 below.

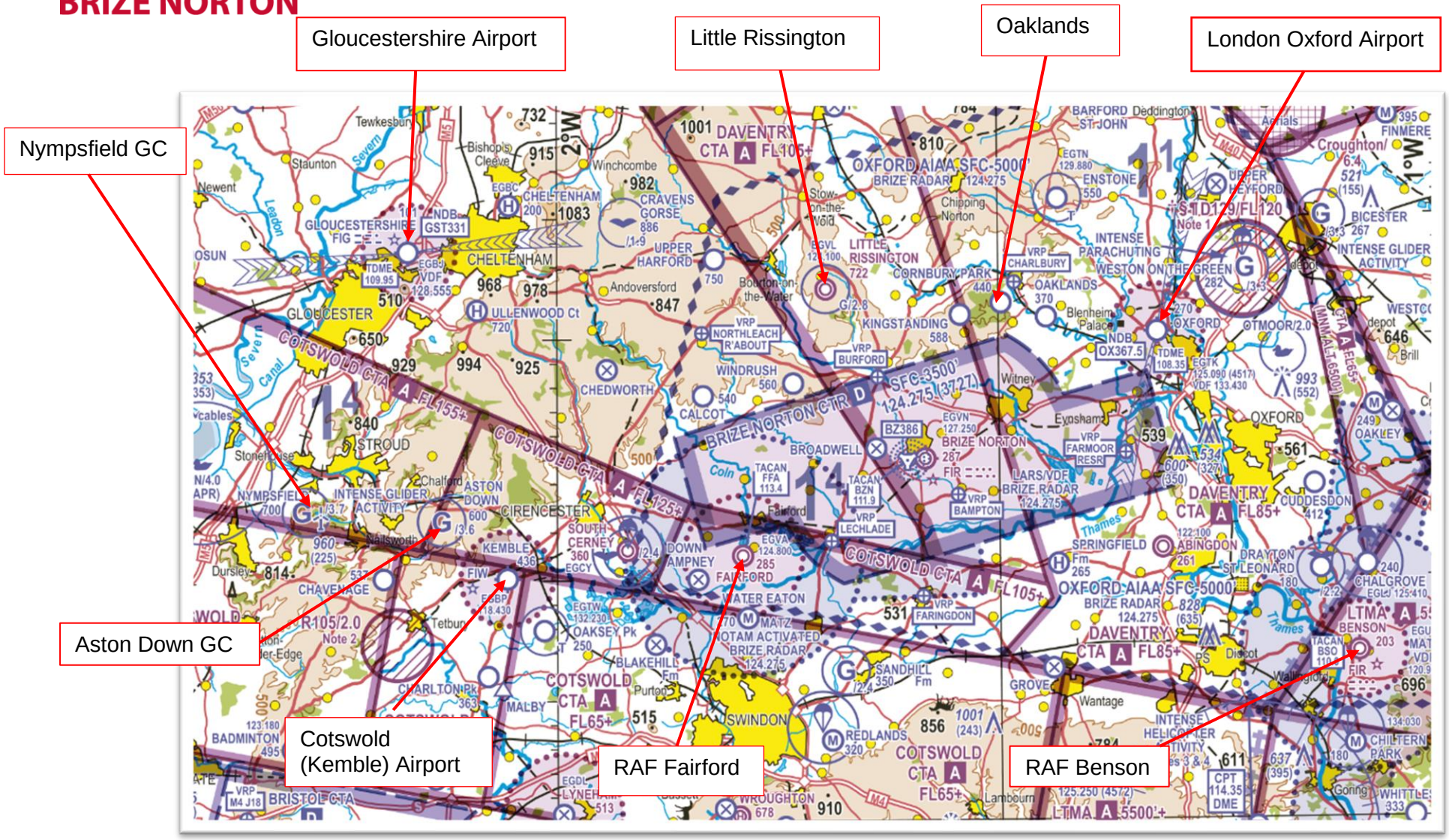


Figure 12 - RAF Brize Norton Local Aerodromes

9.6.1 RAF Benson

RAF Benson and No 22 Group[11] were concerned about the combined impact of both the RAF Brize Norton proposed ACP and that of LOA. Formal responses and responses from individuals indicated some concern at the potential for funnelling for aircraft who choose to avoid the airspace. This could lead to an increase in traffic immediately to the west of the RAF Benson MATZ.

This was recognised by RAF Brize Norton and the proposed changes to the airspace design have been developed with a view to reducing the potential for funnelling. In addition, the change from Class D to Class E+ is seen as positive in encouraging VFR aircraft to participate rather than avoid the airspace. RAF Benson and RAF Brize Norton are developing a Letter of Agreement to confirm how they intend to operate together if this proposal is successful. Finally, while it is not submitted as part of this proposal, of relevance the LOA ACP no longer includes Class D airspace shown during the consultation. Together with the measures introduced by RAF Brize Norton, the new designs significantly reduce any potential for funnelling.

9.6.2 RAF Fairford

RAF Fairford has regularly been informed of progress with this ACP. Although the ATC tower is staffed by ATCOs from the USAF, any aircraft operating from RAF Fairford are handled by RAF Brize Norton ATCOs. Any proposed changes to the airspace arrangements will not affect this enduring arrangement. The existing Letter of Agreement will be reviewed and updated in accordance with standard procedures.

9.6.3 Cotswold (Kemble) Airport

RAF Brize Norton and Cotswold Airport have enjoyed an enduring relationship over the years. Cotswold Airport was involved in the very early stages of the project and verbal agreement in principle to the proposed designs was obtained. The two airports already have a Letter of Agreement, which will need updating if this ACP is successful. Cotswold Airport underwent a change in management in 2017. Since then the new Operations Director has embarked on a CAP 1616 change to introduce RNAV procedures at Cotswold Airport. Cotswold Airport employs Flight Information Services Officers (FISO); there is no ATC provision for Aerodrome or Approach Control.

RAF Brize Norton intends to handle aircraft departing Cotswold Airport to join CAS at MALBY and will provide clearances as required to first enter the RAF Brize Norton CAS. Aircraft inbound to Cotswold will be handled in a similar way to today; a service will be provided upon request, until the aircraft is able to change to Cotswold Information. New versions of Letters of Agreement are currently being developed that will capture both the RAF Brize Norton ACP and the Cotswold Airport ACP.

9.6.4 Aston Down and Nympsfield Gliding Clubs

Aston Down and Nympsfield Gliding Clubs were concerned about the impact of CTA 9 and CTA 10 (as per the consulted design) on their operations, and about the impact on cross country gliding for those who wish to fly within the Oxfordshire

[11]Royal Air Force Number 22 Group provides the qualified and skilled personnel that the RAF and the other two Services need to carry out operations world-wide. 22 Group has a wide area of interest with responsibilities for many aspects of training including Air Experience Flying (AEF) and flying training for all types of aircraft (rotary wing, fast jet, multi-engine aircraft).

area. RAF Brize Norton has always been willing to develop a Letter of Agreement to support gliding operations to the west of the airport, and to allow use of CAS under specific conditions, whenever this is possible. It is accepted that gliders may not be radio equipped or transponder equipped. The design review concluded the base of requested CAS in the area previously known as CTA 9, could be raised from 3,500 ft to 4,500 ft; the classification has also changed from Class D to Class E+ from 4,500 to 6,000 ft. The area previously known as CTA 10 has a base of 5,000 ft which is Class E+ up to 6,000 ft and then Class D above where this abuts the Class A airway. The change of classification from Class D to Class E+ of what was CTA 10 reduces the onus on VFR aircraft from requesting a clearance, provided aircraft comply with the RMZ/TMZ regulations. The change to the classification of airspace should negate the requirement for a specific Letter of Agreement with RAF Brize Norton with specific gliding clubs, as greater operational flexibility is achieved with Class E+ under VFR.

9.6.5 Gloucestershire Airport

Gloucestershire Airport also enjoys a good working relationship with RAF Brize Norton. RAF Brize Norton currently handles aircraft departing Gloucestershire Airport wishing to join CAS and this proposal is not seeking to change this. Gloucestershire Airport raised some concerns about the position of the RNAV IAF on the Gloucestershire Airport procedure in relation to the newly proposed airspace. A Letter of Agreement is currently being developed between the two Airports to establish working practices.

9.6.6 RAF Little Rissington

RAF Little Rissington is a 2Gp Glider airfield just outside the current RAF Brize Norton Class D Airspace. The site conducts winch-launched Glider Ops up to 2,000 ft above ground level (agl) with soaring taking place in the overhead and local area up to 1,000 ft below the height of the cloud base. There is an extant Letter of Agreement between RAF Brize Norton and RAF Little Rissington to describe the interactions between the units and to reduce the inadvertent penetration of their gliding area by traffic flying through the local area. A new Letter of Agreement in principle has already been agreed in between the units detailing the changes required on both parties to ensure operations can continue if the RAF Brize Norton ACP is successful.

9.7 Impact on IFR General Air Traffic and Operational Air Traffic

The proposed change will not affect IFR GAT. The impact on OAT is likely to be limited to ease of access to and from the UK airways network and improved containment of the IFPs.

9.8 Impact on VFR Operations

When Class D airspace was originally proposed, there were significant numbers of objections raised by members of the GA community and their representative organisations, based on the perceived size of the proposed airspace and its resultant impact on GA operations. This has been recognised by the Change Sponsor and has driven the re-design that is described in detail within Section 7. By reducing the vertical and lateral extent of the airspace in some areas, and by changing the classification from Class D to Class E + conspicuity, the Sponsor

believes that the concerns raised have been addressed to the maximum extent possible.

9.9 Impact on RAF Brize Norton Existing Procedures and Capacity

The increase in volume of CAS proposed by the submission will not have any impact on the existing procedures or capacity; it is in fact intended to better contain the existing IFPs than the current CTR. RAF Brize Norton is well resourced to service the airspace, including the increased volume requested. Project MARSHALL will introduce further changes to how ATC is provided within the local area, but this is expected to be managed at RAF Brize Norton and extra ATCOs will be posted into support ATC provision for adjacent airfields.

9.10 Flight Planning Restrictions

The changes proposed by this ACP will address safety concerns identified regarding how aircraft access and egress the UK Airways network. From a Flight Planning perspective, aircraft will join and leave CAS at the same points and transfer of control and communication will be handled in the same way as it is today. Aircraft not joining the airways network will leave the CAS and continue within Class G under a LARS and will continue en route as per current procedures.

10 Airspace Design

10.1 Final Airspace Configuration

Stakeholder engagement activities with the GA community have led to a reduction in the overall volume of Class D CAS that is being requested. Containment is instead provided by CTAs comprising a combination of Class D and Class E+ conspicuity and an additional area that is Class G RMZ/TMZ to the east adjacent to the LOA airspace. The final design is shown below in Figure 13.

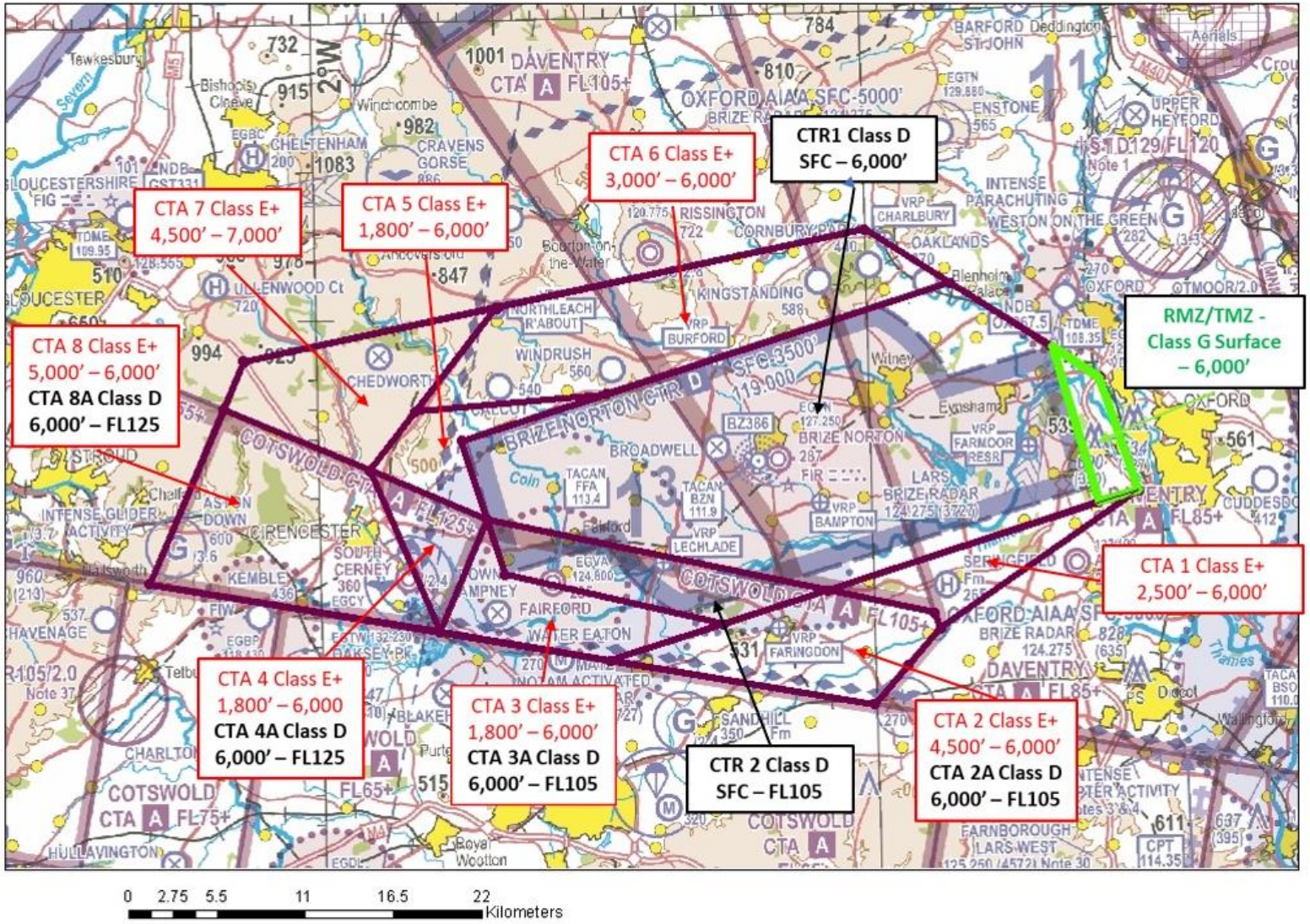


Figure 13 - RAF Brize Norton Final Airspace Design

10.2 Airspace Design Coordinates

The dimensions of the proposed airspace are shown in Table 3 below:

Designation and Lateral Limits	Vertical Limits	Airspace Classification
RAF BRIZE NORTON CTR 1 515048.08N 0012527.00W - 514832.26N 0012001.16W - 514315.91N 0011743.10W - 514033.12N 0013230.90W - 514314.00N 0015058.00W - 514552.97N 0015214.25W - 515048.08N 0012527.00W	Surface to 6,000 ft amsl	Class D
RAF BRIZE NORTON CTR 2 514314.00N 0015058.00W - 514033.12N 0013230.90W - 513930.32N 0013815.39W - 514120.40N 0015003.74W - 514314.00N 0015058.00W	Surface to FL105	Class D
RAF BRIZE NORTON RMZ/TMZ 514832.26N 0012001.16W - 514728.30N 0011728.10W - 514339.48N 0011533.58W - 514315.91N 0011743.10W - 514832.26N 0012001.16W	Surface to 6,000ft amsl	Class G
RAF BRIZE NORTON CTA 1 514339.48N 0011533.58W - 513911.00N 0012629.00W - 513943.00N 0012646.00W - 514033.12N 0013230.90W - 514339.48N 0011533.58W	2,500ft – 6,000ft amsl	Class E + Conspicuity
RAF BRIZE NORTON CTA 2 514033.12N 0013230.90W - 513943.00N 0012646.00W - 513911.00N 0012629.00W - 513639.91N 0013011.00W - 513822.35N 0014428.06W - 514033.12N 0013230.90W	4,500ft – 6,000ft amsl	Class E + Conspicuity
RAF BRIZE NORTON CTA 2A 514033.12N 0013230.90W - 513943.00N 0012646.00W -	6,000ft amsl to FL105	Class D

Designation and Lateral Limits	Vertical Limits	Airspace Classification
513911.00N 0012629.00W - 513639.91N 0013011.00W - 513822.35N 0014428.06W - 514033.12N 0013230.90W		
RAF BRIZE NORTON CTA 3 514314.00N 0015058.00W - 514120.40N 0015003.74W - 513930.32N 0013815.39W - 513822.35N 0014428.06W - 513928.00N 0015338.00W - 514314.00N 0015058.00W	1,800ft – 6,000ft amsl	Class E + Conspicuity
RAF BRIZE NORTON CTA 3A 514314.00N 0015058.00W - 514120.40N 0015003.74W - 513930.32N 0013815.39W - 513822.35N 0014428.06W - 513928.00N 0015338.00W - 514314.00N 0015058.00W	6,000ft amsl to FL105	Class D
RAF BRIZE NORTON CTA 4 514457.50N 0015716.48W - 514314.00N 0015058.00W - 513928.00N 0015338.00W - 514457.50N 0015716.48W	1,800ft – 6,000ft amsl	Class E + Conspicuity
RAF BRIZE NORTON CTA 4A 514457.50N 0015716.48W - 514314.00N 0015058.00W - 513928.00N 0015338.00W - 514457.50N 0015716.48W	6,000ft amsl to FL125	Class D
RAF BRIZE NORTON CTA 5 514654.41N 0015443.15W - 514721.05N 0014418.61W - 514552.97N 0015214.25W - 514314.00N 0015058.00W - 514457.50N 0015716.48W - 514654.41N 0015443.15W	1,800ft – 6,000ft amsl	Class E + Conspicuity
RAF BRIZE NORTON CTA 6 515241.59N 0013000.15W - 515048.08N 0012527.00W - 514721.05N 0014418.61W - 514654.41N 0015443.15W -	3,000ft – 6,000ft amsl	Class E + Conspicuity

Designation and Lateral Limits	Vertical Limits	Airspace Classification
515021.16N 0015011.66W - 515241.59N 0013000.15W		
RAF BRIZE NORTON CTA 7 515021.16N 0015011.66W - 514457.50N 0015716.48W - 514706.29N 0020508.89W - 514843.05N 0020359.72W - 515021.16N 0015011.66W	4,500ft – 7,000ft amsl	Class E + Conspicuity
RAF BRIZE NORTON CTA 8 514706.29N 0020508.89W - 514457.50N 0015716.48W - 513928.00N 0015338.00W - 514116.29N 0020921.76W - 514706.29N 0020508.89W	5,000ft – 6,000ft amsl	Class E + Conspicuity
RAF BRIZE NORTON CTA 8A 514706.29N 0020508.89W - 514457.50N 0015716.48W - 513928.00N 0015338.00W - 514116.29N 0020921.76W - 514706.29N 0020508.89W	6,000ft amsl to FL125	Class D

Table 3 - Dimensions of Proposed RAF Brize Norton Airspace

10.3 Proposed Instrument Flight Procedures

The new IFPs have been produced by NATS PDG. Whilst the MAA undertakes the Regulatory Approval of the IFPs at Military Aerodromes, the introduction of new IFPs has driven the lateral and vertical limits of the proposed airspace design to ensure that the IFPs are contained. This was a key objective of the MOD from the outset.

Therefore, we have chosen to include the proposed IFPs as part of this document, to show which factors have influenced the lateral and vertical extents of the airspace.

10.3.1 Standard Instrument Departures

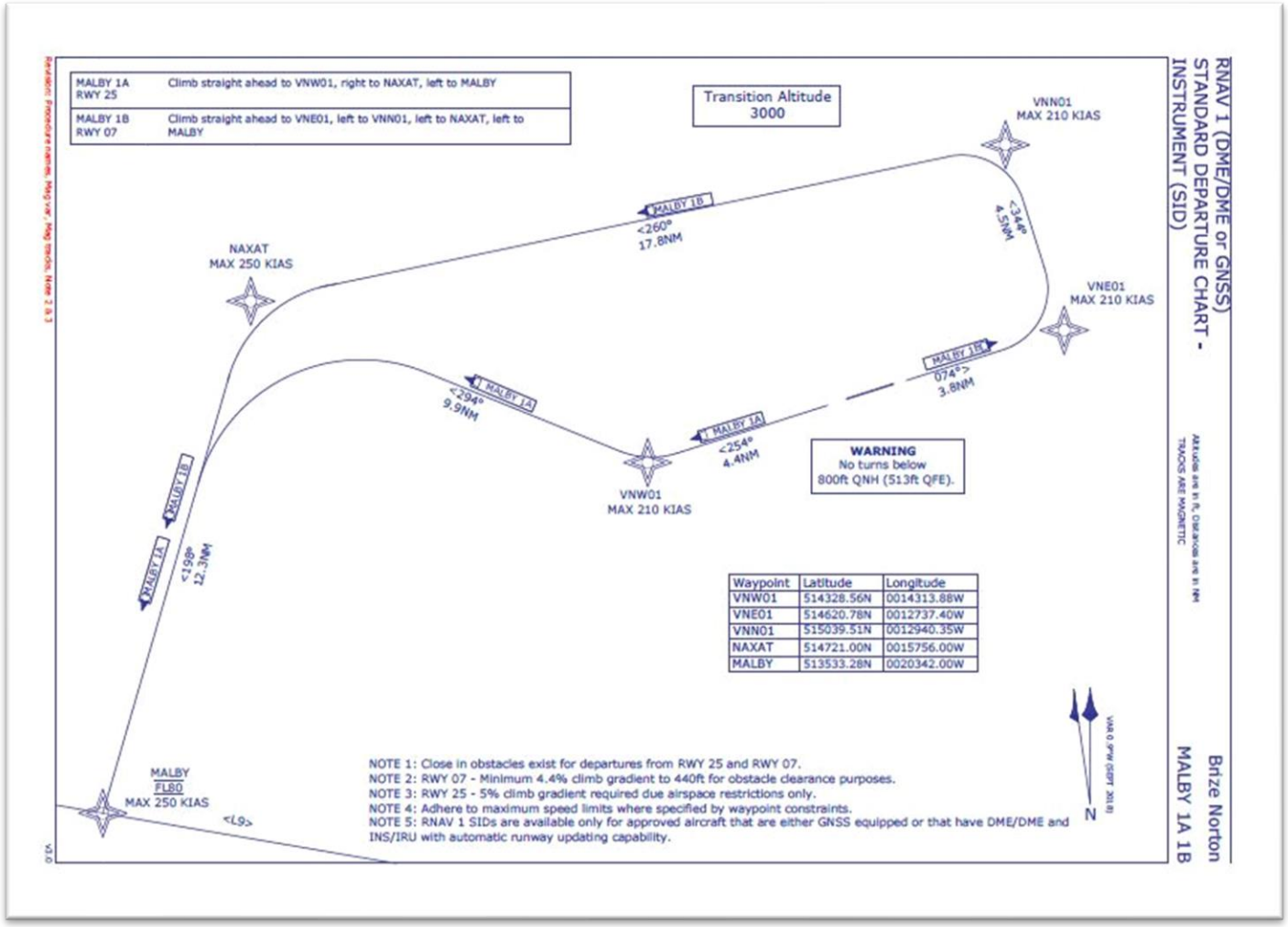


Figure 14 – RNAV 1 Standard Arrival Route Standard Instrument Departure MALBY 1A 1B

10.3.2 Standard Arrival Routes (STArs)

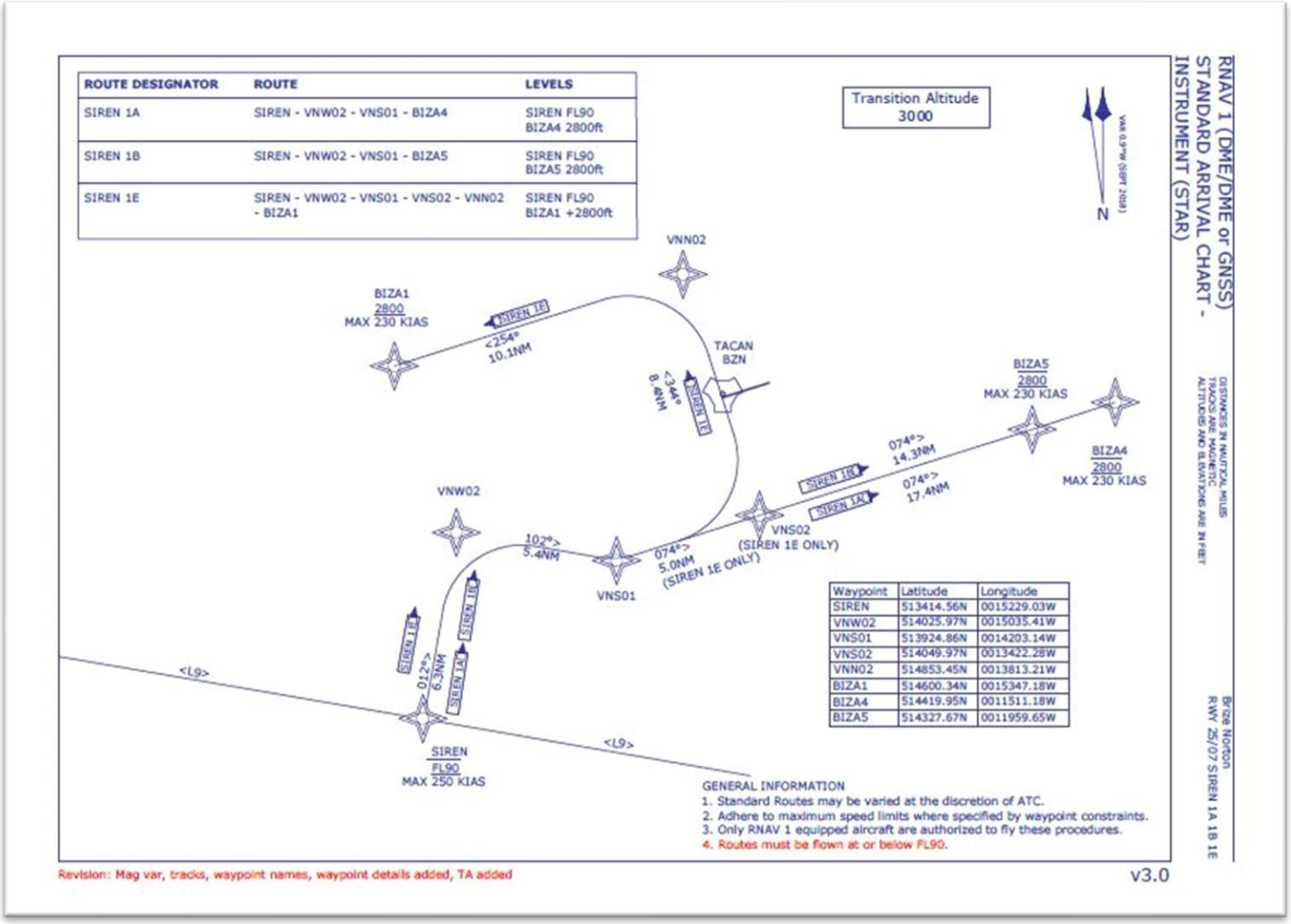


Figure 15 - RNAV 1 Standard Arrival Route SIREN 1A 1B 1E.

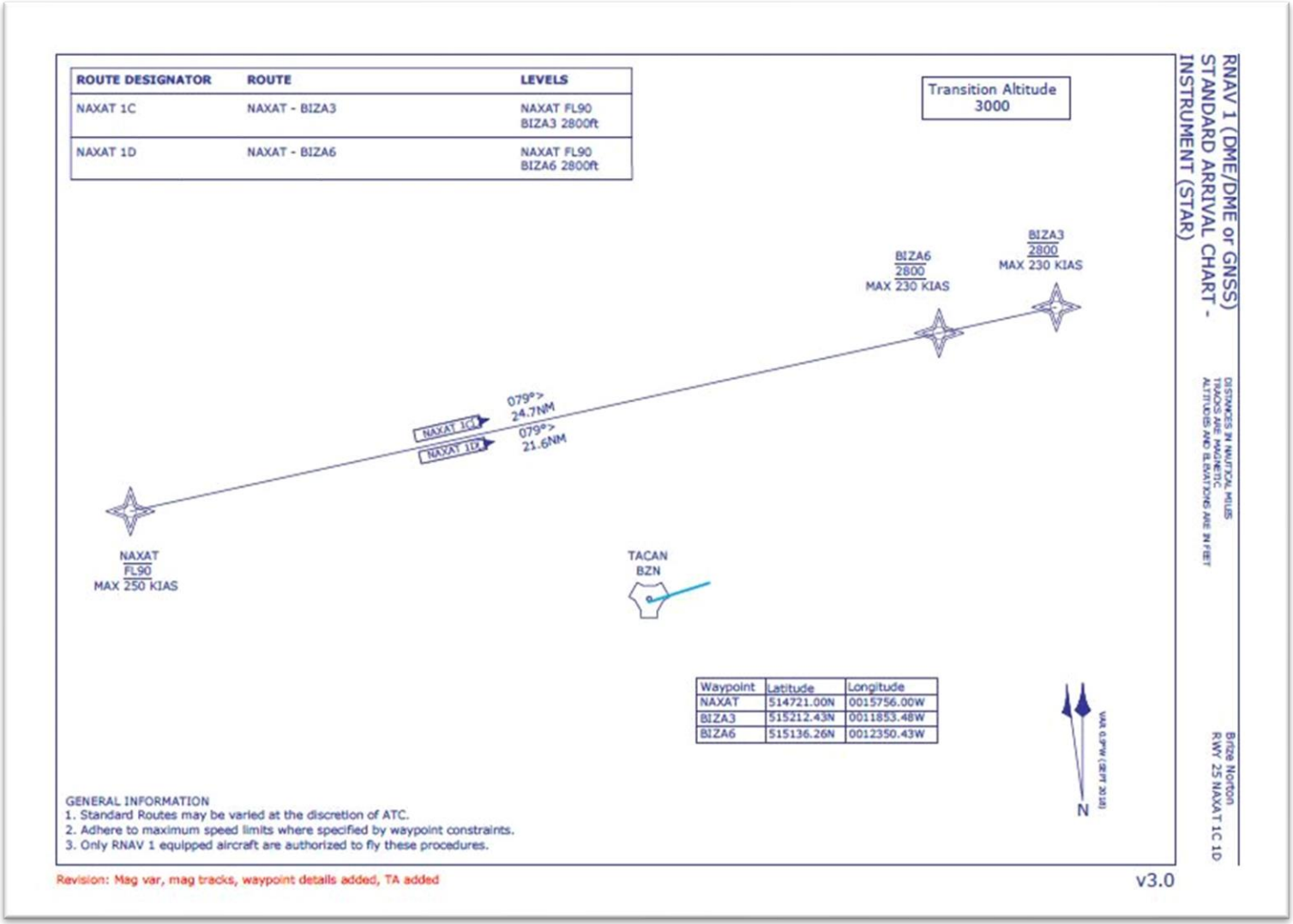


Figure 16 - RNAV 1 Standard Arrival Route NAXAT 1C 1 D

10.3.3 Instrument Approach Procedures – Runway 07

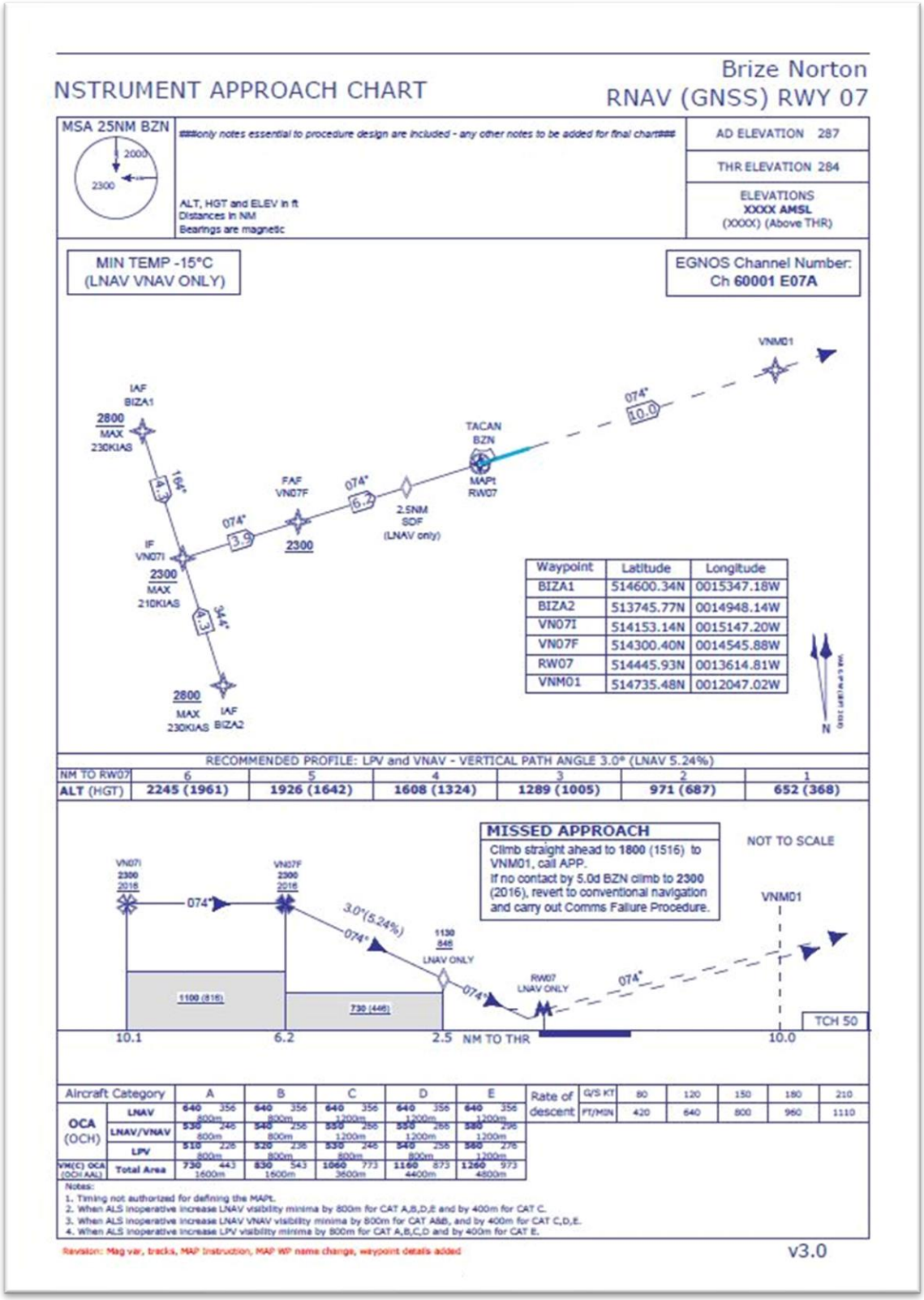


Figure 17 - RNAV (GNSS) Runway 07

10.3.4 Instrument Approach Procedures Runway 25

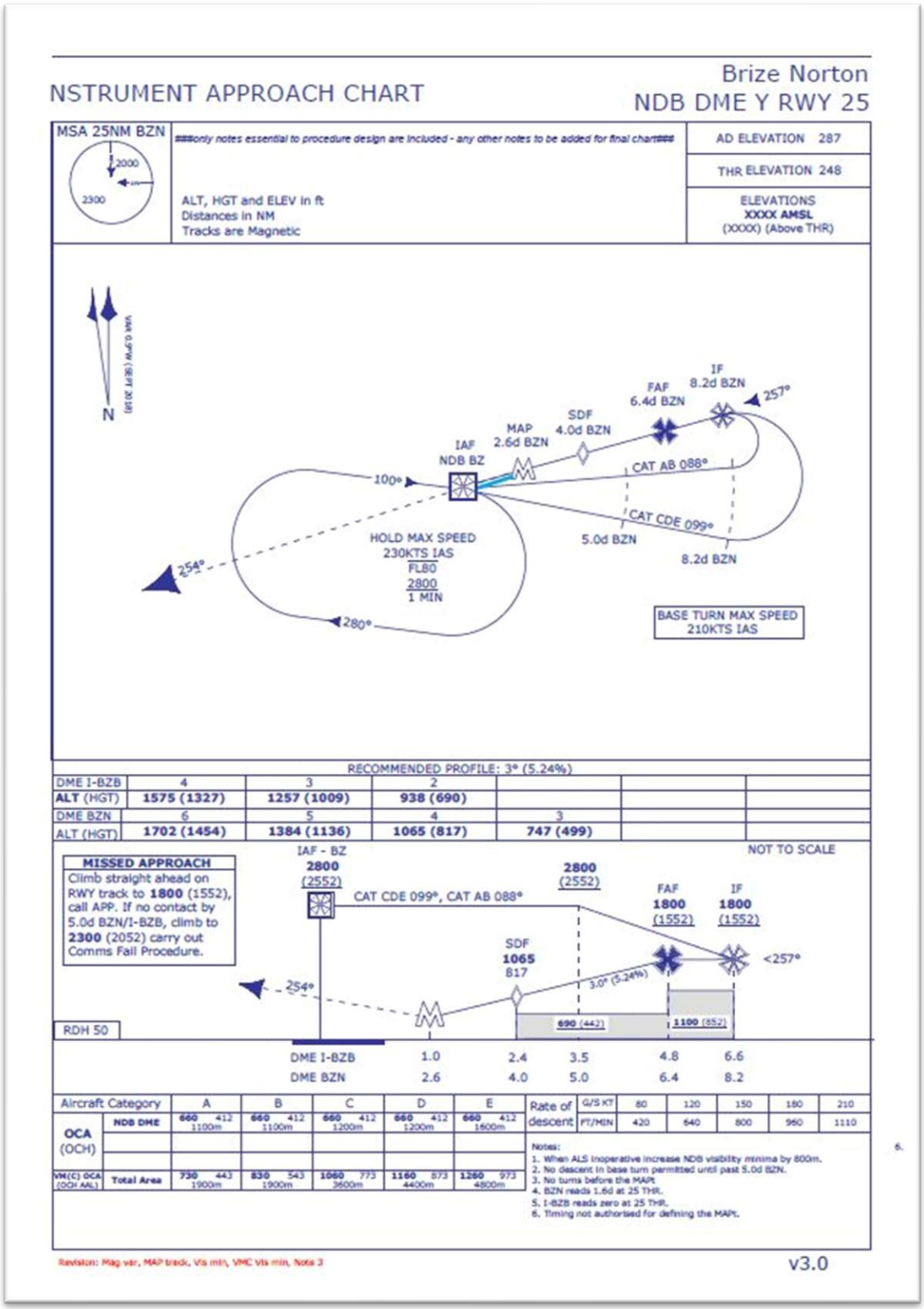


Figure 18 - NDB DME Y Runway 25

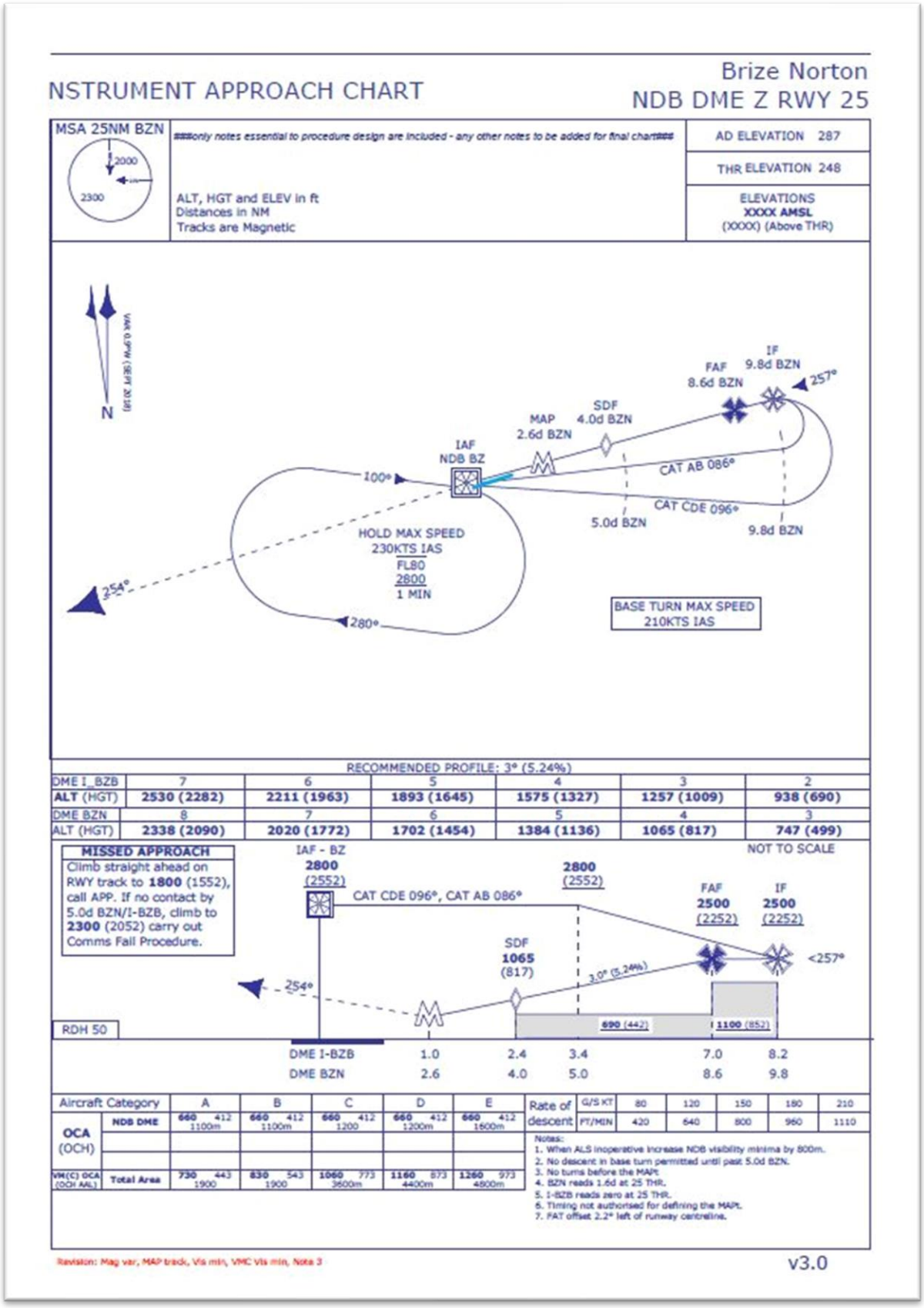


Figure 19 - NDB DME Z Runway 25

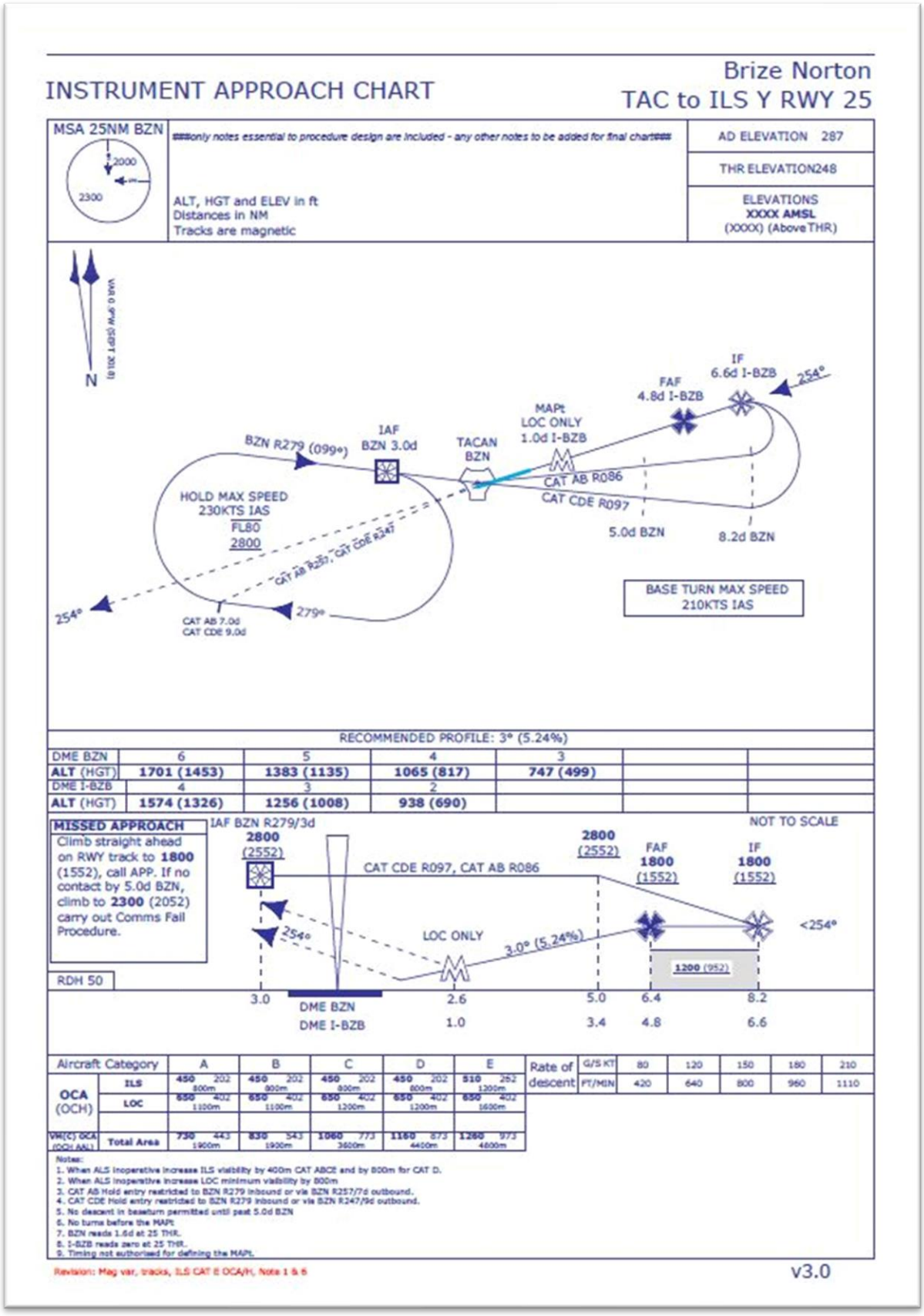


Figure 20 - TAC to ILS Y Runway 25

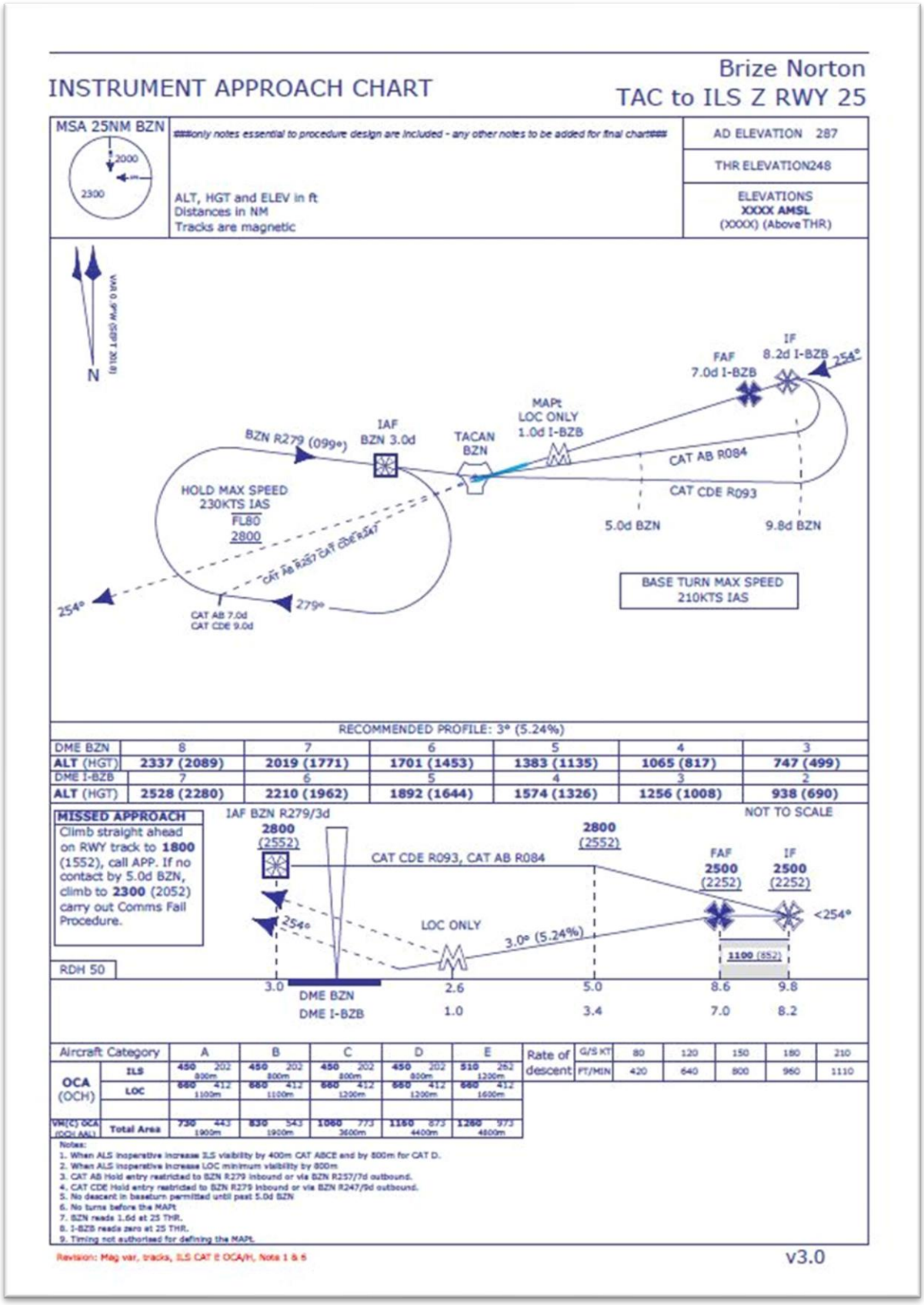


Figure 21 - TAC to ILS Z Runway 25

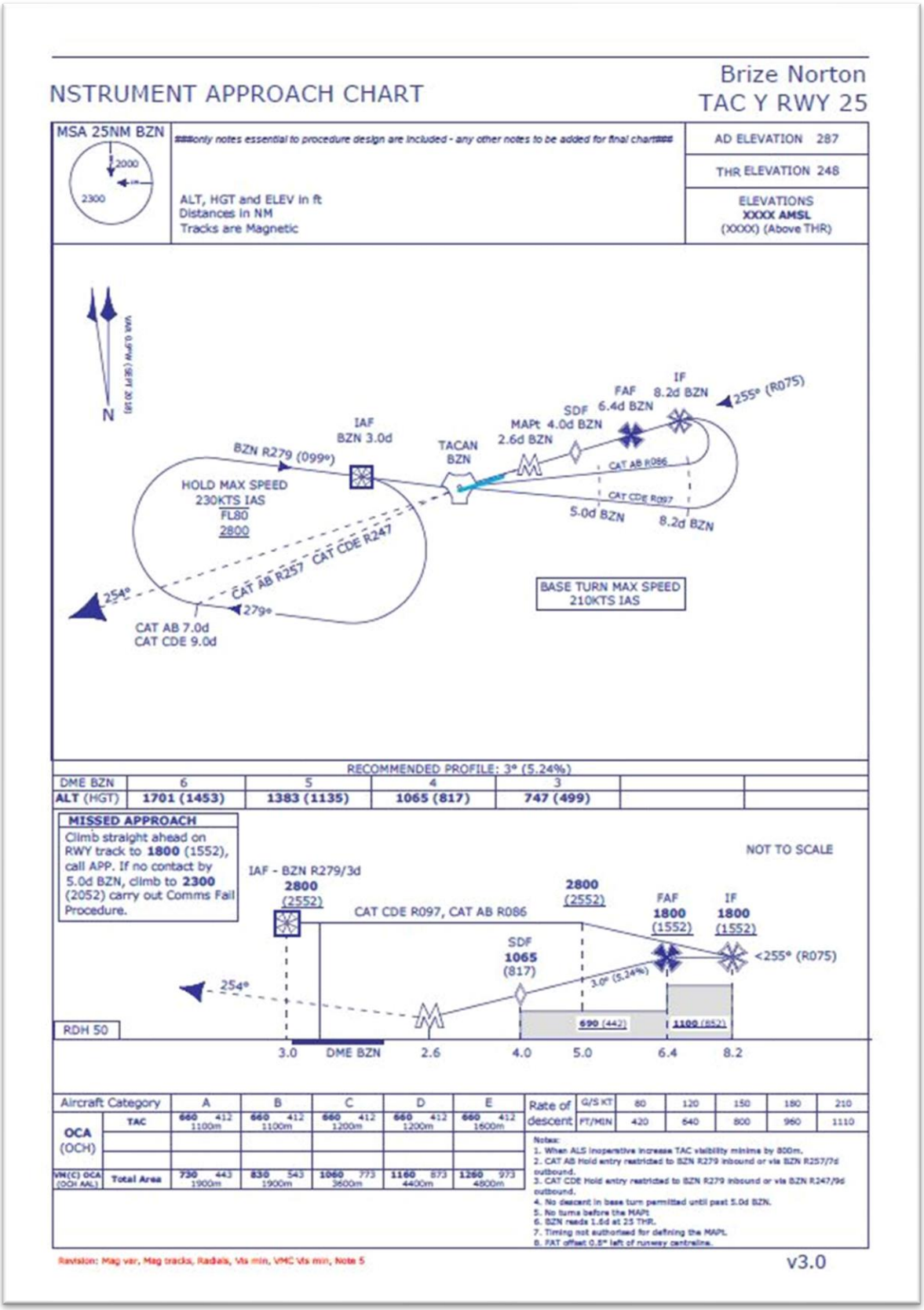


Figure 22 – TAC Y Runway 25

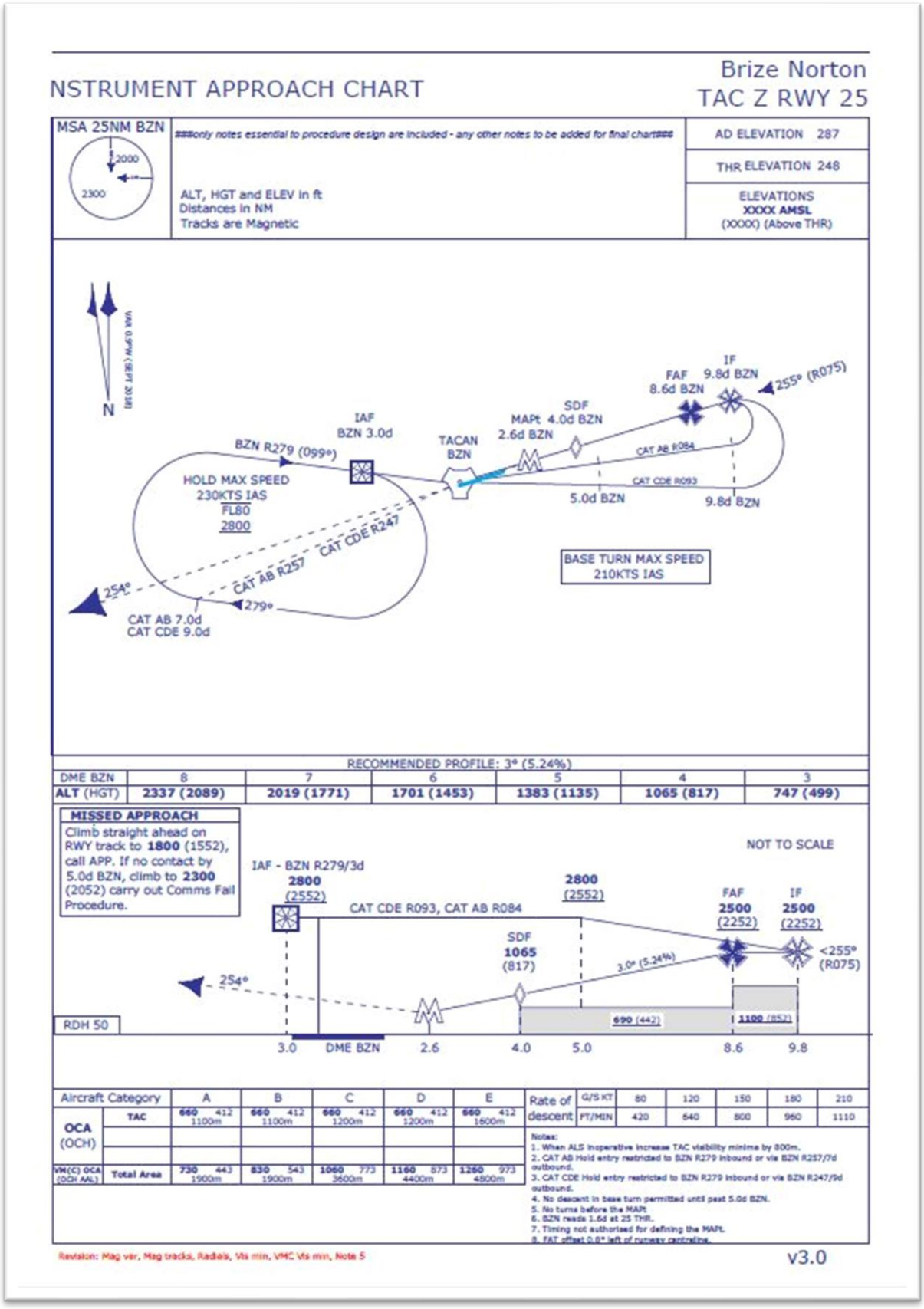


Figure 23 - TAC Z Runway 25

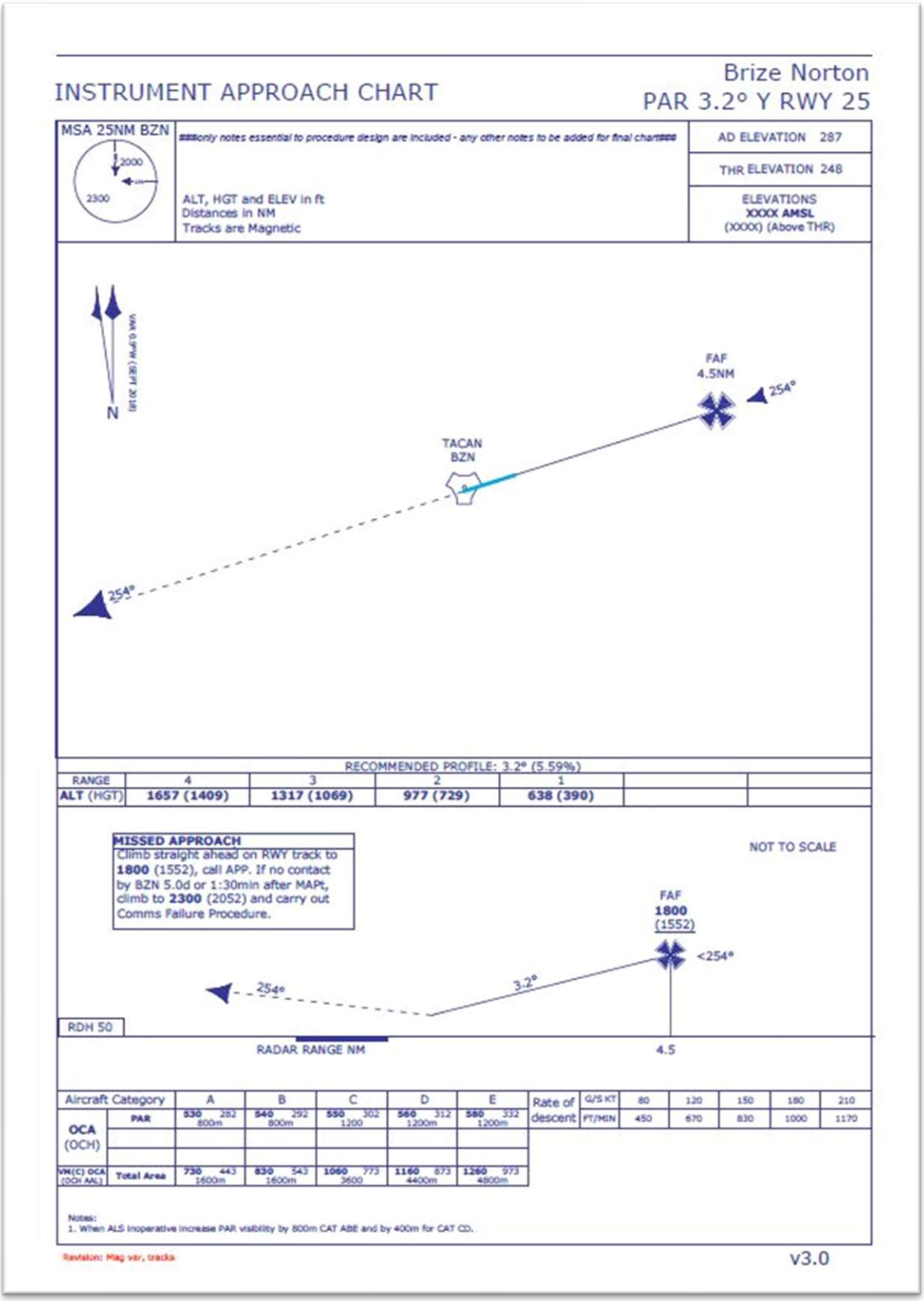


Figure 24 - PAR 3.2° Y Runway 25

10.4 Airspace Design Compliance with ICAO Standards and UK Policy

The airspace design documentation produced can be found at Annex A3.

10.5 Breakdown of Airspace by Section

Airspace Name	Vertical	Defining Factor (upper level)	Defining Factor (lower level)	Defining Factor (lateral limits)
CTR 1	GND-6000	Hold - Arrivals from Airways.	Visual circuit and final approach procedures.	Radar vectoring pattern, holds, base turns, missed approaches, etc.
CTR 2	GND-FL105	Allows aircraft leaving the airways network to descend for final approach within CAS.	Visual circuit and final approach procedures.	Radar vectoring pattern, holds, base turns, missed approaches, etc.
RMZ/TMZ	Surface to – 6,000 ft	Aircraft high on base turn and RNAV procedure (CDA).	Short conventional and RNAV procedures. Ideally containment should be provided with CAS, but this is a compromise to facilitate coordination with LOA.	Radar vectored to ILS RWY 25, both short and long final approach procedures RWY 25, base turns, RNAV initial approaches RWY 25.
1	2,500 ft - 6,000 ft	Arrivals from airways to RWY 25, hold on BZ.	Radar vectored to RWY 25, base turn RWY 25, RNAV to RWY 25. Should be 1,800ft for base turn and radar vectoring but could be 2,300ft for RNAV procedure. Base level raised as a compromise for GA to mitigate against funnelling and pinch points.	Base turn RWY 25, RNAV arrival to RWY 25, Radar vectoring to RWY 25, all non-compliant. Must be monitored by surveillance to ensure aircraft do not leave CAS.
2 and 2A	4,500 ft-6,000 6,000 ft - FL105	Allows aircraft to be transferred from airways (Sector 23) within CAS; transfer of control to BZN allows ATCOs to sequence.	Arrival from airways to both procedures. To certain degree to provide vertical overlap with the top of the CTR at 6,000ft. Allows for descent of aircraft	The BZN hold is the most restrictive factor, but containment of arrivals has been given the highest priority.

Airspace Name	Vertical	Defining Factor (upper level)	Defining Factor (lower level)	Defining Factor (lateral limits)
			released from airways. An arriving aircraft needs to descend to at least 5,500ft to enter CTA1 and CTR1.	
CTA 3 and 3A	1,800 ft 6,000 ft 6,000 ft - FL105	Descending an aircraft arriving high from the airway. Under airspace sharing arrangements agreed with NATS Sector 23 aircraft will be transferred to RAF Brize Norton.	All the approaches descend to 2,300 ft so this is driven by the 500ft containment policy.	All the procedures apart from the short Cat AB base turns.
CTA 4 and 4A	1,800 ft – 6,000 ft 6,000 ft - FL125	Allows departing aircraft to be able to climb higher when joining at MALBY. Also ensures that the design fits with the existing structure and does not create cul-de-sacs that cannot be easily used by Class G users.	This protects the descent down to 2,300ft for the longer base turn procedures, radar vectoring onto final, and the RNAV to RWY 07.	The RNAV initial leg from the north is just the most restrictive followed by radar vectoring to the RWY 07 final and the base turn procedure.
5	1,800 ft-6,000 ft	Aircraft high on the base turn to RWY 07 and flying the RNAV to RWY 07 CDA.	As above for 4.	As above for 4.
6	3,000 ft-6,000 ft	Aircraft descending on the arrival to RWY 07, aircraft climbing on RWY 07 SID. It is required to provided vertical overlap with CTA 7.	Aircraft climbing on the SID 07 and descending on the Arrival.	RNAV SID RWY 07, Hold.
7	4,500 ft-7,000 ft	Allows aircraft to climb on the SID to join CAS at MALBY and provides vertical overlap with CTA 8.	Provides overlap with CTA 8 to allow climb to join airway at MALBY.	SIDs for both runways.

Airspace Name	Vertical	Defining Factor (upper level)	Defining Factor (lower level)	Defining Factor (lateral limits)
8 and 8A	5,000 ft - 6,000 ft 6,000 - FL125	Allows for higher climb levels to join airway at MALBY and to prevent areas of Class G airspace creating cul-de-sacs that would not be used easily by Class G users.	Provide overlap with CTA 8.	Both SIDs.

11 Safety Methodology

11.1 Introduction

The CAA publication CAP 725 provides detailed guidance on the Airspace Change Process and includes the requirement for a robust safety management process to be an integral part of any ACP, including the introduction of IFPs.

Both the MAA and the CAA Safety and Airspace Regulation Group (SARG) require assurance that the changes introduced by the introduction of RNAV IFPs and revised airspace arrangements will result in safe air operations at all stages of the project lifecycle; this will be true of RAF Brize Norton and any other stakeholders impacted by the changes.

The form of this assurance is an operationally focused Safety Case, structured in four parts as detailed in the RAF Brize Norton Safety Programme Plan [Reference 11, which was developed in accordance with Defence Standard (Def Stan) 00-56 Safety Management Requirements for Defence Systems [Reference 12].

11.2 Safety Methodology

This ACP is supported by a four-part suite of Safety Case Reports. These reports have been completed throughout the process and updated when design modifications have been made. The safety documentation has been prepared in accordance with CAP 760 Guidance on the Conduct of Hazard identification [Reference 13]. The Safety Case Parts 1 and 2 have been completed and submitted to the CAA in accordance with CAP 725 process. The Safety Case Parts 3 and 4 are as complete as is possible at this stage; they will be fully signed off once the airspace has been approved and implemented. Draft versions of the Safety Case Part 3 and 4 have also been submitted to the CAA.

11.3 ACP Safety Assurance Strategy

11.3.1 Overview

The Safety Assurance Strategy for the ACP is to demonstrate satisfaction of a safety argument with the overarching top-level claim that:

> *"the proposed airspace changes and new flight procedures will be acceptably safe when introduced into operational use and throughout their in-service usage"*.

To achieve this, a Systems Engineering approach to safety assurance has been adopted, which included the main activities detailed in the paras below.

11.3.2 Hazard Identification

Identification of the hazards associated with the introduction of the revised airspace arrangements at RAF Brize Norton involved a Hazard Identification (HazID) workshop.

The HazID workshop was based on contextual diagrams which were developed to show the boundaries of the study, the physical and functional interfaces associated with the revised airspace arrangements and other interactions that could influence safety e.g. ATCO, pilot, and equipment interfaces.

A hazard review meeting was held when some aspects of the proposed airspace designs were modified. This ensured that the identified hazards remained valid and that any new hazards, associated with the design modification, were identified.

11.3.3 Part 1 Safety Case Report

The Part 1 Safety Case Report concerned the development of the Safety Objectives and Requirements. Analysis of the HazID results led to the identification of key areas for mitigation. The result of the analysis was a list of Safety Objectives and Requirements.

11.3.4 Part 2 Safety Case Report

The Part 2 Safety Case Report presented Claims, Arguments and Evidence to support the Safety Argument. In support of the Safety Argument, the Part 2 Safety Case Report also demonstrated that the designs of the new airspace arrangements and the RNAV IFPs proposed for BZN, met the Safety Objectives, Safety Requirements and Regulatory Requirements that were set in the Part 1 Safety Case Report.

11.3.5 Part 3 Safety Case Report

The development of the Part 3 Safety Case Report will focus on the safe introduction of the new airspace arrangements and RNAV IFPs into initial operational service. The essence of this work will be to demonstrate that BZN is ready to operate with the proposed new airspace arrangements and the RNAV IFPs.

11.3.6 Part 4 Safety Case Report.

The Safety Case Part 4 will detail the processes and procedures (ATC and ATE) associated with the continued day-to-day operation and support of the new airspace arrangements and RNAV IFPs and will describe the practical measures by which safety will be managed and ensured through-life. Further, the Part 4 Safety Case Report will report on full satisfaction of the Safety Argument and full compliance with all derived Safety Objectives and Requirements.

11.4 Safety Summary

11.4.1 Satisfaction of Safety Argument

Claims, Arguments and Evidence are presented in the Part 2 Safety Case report in order to support the overarching, top-level Safety Claim, the proposed airspace

changes and new flight procedures will be acceptably safe when introduced into operational use and throughout their in-service usage.

However, at this stage of the project, full satisfaction of the safety argument is not possible, since the evidence of satisfaction is not yet available. Full satisfaction of the Safety Argument will be demonstrated during the Transition into Service (Part 3 Safety Case Report) and the continued safe Operation and Maintenance (Part 4 Safety Case Report) phases of the project.

11.4.2 Compliance with Safety Objectives and Requirements

The successful use of the RNAV IAPs is reliant upon the GNSS providing the assurance, credibility and confidence that the Signal-in-Space continues to meet the requirements listed in ICAO Annex 10 Volume 1 Radio Navigation Aids [Reference 14]. The data presented in the Part 2 Safety Case report shows that the applicable requirements of ICAO Annex 10 are met.

At this stage of the project, compliance to all the derived Safety Requirements cannot be demonstrated, since the evidence of compliance is not yet available. Compliance with the derived Safety Requirements will be demonstrated during the Transition into Service (Part 3 Safety Case Report) and the continued safe Operation and Maintenance (Part 4 Safety Case Report) phases of the project.

11.4.3 Compliance with Regulatory Requirements

RAF Brize Norton has followed the ACP process defined in CAP 725 including compliance with Airspace and Infrastructure requirements in Appendix A, sections 11 to 14 inclusive of CAP 725.

The RNAV IFPs have been designed in accordance with CAP 785 Approval Requirements for Instrument Flight Procedures for use in UK Airspace [Reference 15] and ICAO Document PANS-OPS 8168 [Reference 16} by a CAA approved design organisation.

Compliance with the Safety Objective for the GNSS Signal-in-Space (see "*Compliance with Safety Objectives and Requirements*" above) demonstrates compliance with ATS Requirements for RNAV (GNSS) Instrument Approach Procedures in CAP 670 Air Traffic Services Safety Requirements [Reference 17], section NAV07.

12 Supporting Infrastructure and Resources

12.1 Introduction

RAF Brize Norton must demonstrate that the proposed airspace change complies with the Supporting Infrastructure and Resources Requirements stipulated in CAP 725. This section will review the requirements and supply evidence of compliance; alternatively, we will supply evidence that shows the Sponsor is able to mitigate the requirement.

12.2 Supporting Infrastructure and Resources

Supporting Infrastructure and Resources Requirements	Compliance or Mitigation	Evidence of Compliance or Mitigation of the Requirement
Evidence to support RNAV and conventional navigation as appropriate, including primary and secondary surveillance radar (SSR) and other navigation aid coverage together with details of planned availability and contingency procedures.	Compliance	Primary and Secondary radar available. Will also be the case under Project MARSHALL.
Evidence of communications infrastructure including R/T coverage, again with availability and contingency procedures.	Compliance	RAF Brize Norton currently provides Aerodrome and Approach control services, including Lower Airspace Radar Service (LARS).
The effects of failure of equipment, procedures and/or personnel with respect to the overall management of the airspace must be considered.	Compliance	Full details are found within the RAF Brize Norton Aerodrome Manual and Air Traffic Controllers Order Book.
The Proposal must provide effective responses to the failure modes that will enable the functions associated with airspace to be carried out including details of navigation aid coverage, unit personnel levels, separation standards and the design of the airspace in respect of existing international standards or guidance material.	Compliance	Full details are found within the RAF Brize Norton Aerodrome Manual and Air Traffic Controllers Order Book.

Supporting Infrastructure and Resources Requirements	Compliance or Mitigation	Evidence of Compliance or Mitigation of the Requirement
A clear statement on SSR code assignment requirements is also required.	Compliance	This ACP will not change the existing SSR code allocations that are currently in place.
Evidence of sufficient numbers of suitably qualified staff required to provide air traffic services following the implementation of a change.	Compliance	

Table 4 - Supporting Infrastructure and Resources Requirements

13 Airspace and Infrastructure Requirements

13.1 Introduction

A key element of an ACP is the requirement to demonstrate that the proposed airspace change complies with the Airspace and Infrastructure Requirements stipulated in CAP 725. This section will review the requirements and the evidence that RAF Brize Norton is able to comply with them or are able to mitigate the requirement.

13.2 Airspace and Infrastructure Requirements and Evidence of Compliance or Mitigation

Airspace and Infrastructure Requirements	Compliance or Mitigation	Evidence of Compliance or Mitigation of the Requirement
The airspace structure must be of sufficient dimensions with regard to expected aircraft navigation performance and manoeuvrability to fully contain horizontal and vertical flight activity in both radar and nonradar environments[12].	Partial	The UK CAA Policy was followed for the initial design, but the volume of airspace was reduced due to concerns raised during consultation. However, containment is improved when compared to the current situation.
Where an additional airspace structure is required for radar control purposes, the dimensions shall be such that radar control manoeuvres can be contained within the structure, allowing a safety buffer. This safety buffer shall be in accordance with agreed parameters as set down in SARG Policy Statement 'Safety Buffer Policy for Airspace Design Purposes Segregated Airspace'.	Partial	The main driver behind the increased volume of airspace is containment of procedures. However, there will still be a requirement for ATCO intervention and sequencing of traffic to take place. The additional volume of airspace to the south will facilitate a longer base-leg section for RW 25 arrivals, and aircraft will be able to turn on to the final approach with a less acute turn, closer to touchdown. This means that both procedurally interpreted, and radar vectored approaches should be able to remain within the confines of the CAS, and therefore reduces the point of confliction with LOA departures from RW 19.

[12] Airspace designs will be predicated on a radar or non-radar environment; loss of radar would require contingency arrangements to be developed to ensure continued safety of aircraft operations.

Airspace and Infrastructure Requirements	Compliance or Mitigation	Evidence of Compliance or Mitigation of the Requirement
The Air Traffic Management (ATM) system must be adequate to ensure that prescribed separation can be maintained between aircraft within the airspace structure and safe management of interfaces with other airspace structures.	Compliance	This will not change as a result of the ACP; full details are provided within the RAF Brize Norton Aerodrome Manual and Air Traffic Controllers Order Book.
Air Traffic Control (ATC) procedures are to ensure required separation between traffic inside a new airspace structure and traffic within existing adjacent or other new airspace structures.	Compliance	This will not change as a result of the ACP; full details are provided within the RAF Brize Norton Aerodrome Manual and Air Traffic Controllers Order Book.
Within the constraints of safety and efficiency, the airspace classification should permit access to as many classes of user as practicable.	Compliance	RAF Brize Norton will provide access to the Class D via an ATC clearance; Class E+ does not require VFR aircraft to request a clearance but compliance with the conspicuity element provides a known traffic environment.
There must be assurance, as far as practicable, against unauthorised incursions. This is usually done through the classification and promulgation.	Compliance	RAF Brize Norton has sought to use geographical ground features to mark the boundaries of CAS. If the ACP is successful, RAF Brize Norton ATC will distribute a Class D and Class E+ guide and offer presentations to local stakeholders.
Pilots shall be notified of any failure of navigational facilities and of any suitable alternative facilities available and the method of identifying failure and notification should be specified.	Compliance	This will not change as a result of the ACP; full details are provided within the RAF Brize Norton Aerodrome Manual and Air Traffic Controllers Order Book.
The notification of the implementation of new airspace structures or withdrawal of redundant airspace structures shall be adequate to allow interested parties sufficient time to comply with user requirements. This is normally done through the AIRAC cycle.	Compliance	If successful, the airspace will be notified within the UK AIAP and the Military AIP.

Airspace and Infrastructure Requirements	Compliance or Mitigation	Evidence of Compliance or Mitigation of the Requirement
There must be sufficient R/T coverage to support the ATM system within the totality of proposed controlled airspace.	Compliance	
Should there be any other aviation activity (low flying, gliding, parachuting, microlight site, etc.) in the vicinity of the new airspace structure and no suitable operating agreements or ATC Procedures can be devised, the Change Sponsor shall act to resolve any conflicting interests.	Compliance	RAF Brize Norton has sought to establish agreement in principle with local sites. Any existing agreements will be reviewed and updated accordingly.
There must be sufficient accurate navigational guidance based on inline VOR/DME or NDB or by approved RNAV derived sources, to contain the aircraft within the route to the published RNP value in accordance with ICAO/Eurocontrol Standards.	Compliance	
Where ATS routes adjoin Terminal Airspace there shall be suitable link routes as necessary for the ATM task.	Compliance	N/A
All new routes should be designed to accommodate P-RNAV navigational requirements.	Believed to be compliant	NATS PDG has designed the IFPs associated with this project.
If the new structure lies close to another airspace structure or overlaps an associated airspace structure, the need for operating agreements shall be considered.	Partial	CONOPs and a formalised Letter of Agreement is being developed with LOA. A new Letter of Agreement is being developed with NATS S23.

Table 5 - Airspace and Infrastructure Requirements and Evidence of Compliance or Mitigation

14 Economic and Environmental Impact

14.1 Introduction

CAP 725 states:

> *"Change Sponsors may develop, where practicable, a short economic impact assessment which includes all categories of operations, users and those likely to be affected by the change. The economic impact should cover both the operational economic impact (covering areas such as savings or cost associated with resultant changes to track mileage for both Commercial Air Transport (CAT) and GA traffic, impact on recorded delays, etc. as appropriate) and the environmental economic impact (refer to Appendix B, Section 9).*

However, RAF Brize Norton is a state aerodrome, and it is therefore exempt from conducting any environmental assessments except where its proposal is likely to have an impact on established civil air routes.

14.2 Traffic Forecasts

Since this is a military state-owned Airport, this ACP is not proposed to introduce any tangible commercial benefits. The use of the airport is determined by the Defence Planning Assumptions (DPAs) and tasking by the UK government. Whilst there will inevitably be peaks and troughs in the use of the airport, the propose ACP is not anticipated to result in an increase in the number of aircraft movements.

14.3 Impact of Noise

Civil airports are required to undertake Environmental Assessments for ACPs that include the production of Noise Contours. Conventional noise exposure contours that are produced regularly for major airports, are calculated for an average summer day over the period from 16 June to 15 September inclusive, for traffic in the busiest 16 hours of the day, between 0700 and 2300 local time. These are known as LAeq, 16-hour contours. This calculation produces a cautious estimate (i.e. tends to over-estimate) noise exposure. This is mainly because airports are generally busier during the summer and a higher number of movements is likely to produce higher LAeq values. Aircraft tend to climb less well in higher temperatures, so because they are closer to the ground, LAeq values will tend to be higher than in colder weather.

Change sponsors of civil ACPs are required to produce contours when the proposed change includes changes to arrival and departure routes for traffic below 4,000 ft agl. This height of 4,000 ft is used because aircraft operating above this height are unlikely to affect the size or shape of the LAeq contours.

CAP 725 states that contours must be portrayed from 57 dB LAeq, 16 hours at 3 dB intervals. DfT policy is that 57 dB LAeq, 16 hours represents the onset of significant community annoyance. Air Navigation Guidance issued in 2014 [Reference 3] suggested that the level that aircraft noise could become 'annoying'

to people starts at levels lower than 57 dBA, and the recommendation was made to model to 54dBA.

RAF Brize Norton is not required to conduct environmental assessments due to its military status. However, an assessment was made to ensure that the proposed changes would not see an increase of 10,000 or more of the number of people within the vicinity exposed to 54dB LAeq.

The 54dB LAeq noise contours were produced for existing aircraft movements in summer 2017. They were calculated by the FAA[13] Aviation Environment Design Tool (AEDT) (version 2d) in order to meet the requirements of the DfT and the CAA.

They were based on RAF Brize Norton traffic data during the 92-day summer period (16 June – 15 September 2017, 0700-2300 local time) for aircraft utilising Runway 25 and Runway 07. Aircraft details including available aircraft types were input to AEDT, and differentiation was made between arrival and departure profiles. For those specific aircraft models not contained in the AEDT database, a comparative aircraft model was used.

The modelling utilised traffic experienced at RAF Brize Norton over three separate weeks during the summer period of 2017 which allowed us to determine a 100% westerly and easterly average day which allowed an average summer day to be input into AEDT using a modal percentage split of 70/30 to reflect which runway is used more frequently. This allowed a production of average mode contours for an average summer day.

The modelling showed that with the existing flight profiles, the 54dB LAeq noise contour does not affect more than 10,000 people.

14.4 Impact on GA Flight Profiles

If the proposal for new controlled airspace is successful, there is a possibility that some GA aircraft may choose to route around the airspace, rather than call either RAF Brize Norton or LOA ATC to transit the airspace. However, the change of classification from Class D to Class E airspace significantly reduces the burden on GA airspace users, particularly when operating VFR. Equally, the proposal gives airspace users two options to 'participate', either by transponding or making two-way radio contact with RAF Brize Norton. This will ensure continued access to airspace with minimal impact on pilot workload. Use of the 'Listening-Squawk' is the preferred option as it shows that aircraft are VFR and that they are listening out on the frequency, and therefore there is no requirement to call. However, if RAF Brize Norton ATCOs have traffic that might affect the VFR aircraft, TI can be passed. It is accepted that there could be a slight increase in GA traffic around the periphery of the airspace, but this is impossible to predict as it would require a pilot to elect to not operate a transponder and not make two-way radio contact.

As part of a deployment plan, RAF Brize Norton will actively encourage GA pilots to call ATC and/or operate a transponder, the key message being that the creation of a known traffic environment will ensure all parties are aware of any potentially conflicting traffic, and a resolution to any conflictions will be provided. Since there is no requirement for VFR flights to file a flight plan, and since there

[13] Federal Aviation Authority (FAA). The US equivalent of the CAA whose tools are regarded by the CAA as appropriate for this type of analysis.

are not formally published GA VFR routes, it is neither possible to predict the actual numbers of GA aircraft that will choose to route around any new airspace, nor is it possible to accurately quantify the number of GA aircraft that might be affected by any change. However, the Sponsor believes that, due to the additional mitigation measures put in place, numbers are likely to be minimal. Equally, provision will always be made for aircraft that will be unable to comply with either an RMZ or TMZ.

14.5 Tranquillity and Visual Intrusion

For the same reasons as stated in Section 14.1, the ACP is not considered to have any negative impact on tranquillity and visual intrusion.

14.6 Anticipated Level of Fuel Burn/CO_2 Emissions

Since RAF Brize Norton is a military aerodrome, it is not required to conduct Environmental Assessments that would be required by a civil airport unless the ACP alters any established civil air routes.

However, the Guidance to the CAA on environmental objectives (DfT, 2014) recognises that aviation is a growing contributor to greenhouse gas emissions that causes climate change. The Government's strategy on aviation is to ensure that the aviation sector makes a significant and cost-effective contribution towards reducing global emissions. This airspace change will ensure aircraft departing from and arriving into RAF Brize Norton are able to do so using more direct routings and more efficient vertical flight profiles. The reduction in the number of avoiding action turns and re-routes due to unknown conflicting traffic will contribute to this objective in a positive way.

This positive impact must be balanced against the traffic that would choose not to route through the new controlled airspace and would therefore fly a longer route to its intended destination. This additional routing would not need to be flown by those aircraft that choose to call RAF Brize Norton to cross the CTR/CTAs. At this stage it is not possible to accurately balance these issues, but RAF Brize Norton will engage with local flying clubs to encourage them to call and participate. Guidance will be provided on suggested routes to take and also some suggested shortened Radio Telephony (RT) phrases will be suggested.

14.7 Anticipated Effect on Local Air Quality

CAP 725, Appendix B, Annex 8 identifies that local air quality at ground level remains largely unaffected by aircraft emissions that take place above 3,000 ft agl because dispersion reduces concentration levels for these emissions. It is understood that in the context of local air quality, the overall objective under CAP 725 is to determine whether the proposed airspace changes will exceed any statutory air quality standards, and if so, what contribution the airport operations make towards such departures.

The local air quality at RAF Brize Norton is unlikely to change because of this proposal. The fact that numbers of aircraft flying locally are not intended to increase because of this change, combined with the more efficient use of the

airspace and reduced incidents of avoiding action all indicate that if anything, there will be a negligible or net improvement in local air quality.

14.8 Economic Valuation of Environmental Impact

As RAF Brize Norton is a military airfield, no assessment has been made on the proposed economic value associated with the change.

15 Supporting Maps, Charts and Diagrams

15.1 Target AIRAC Date

The IFPs will not be published in the UK IAIP [Reference 7] but should the request for additional airspace be approved, the new CTR and CTA dimensions will be published in the UKIAIP.

The CAA requires a minimum of 17 weeks to consider the proposal before making a Regulatory Decision. Due to the issues associated with the COVID 19 global pandemic, it would be reasonable to suggest that this period may take longer than normal. Therefore, the target AIRAC implementation date is:

AIRAC 02 – 25th February 2021

15.2 Draft AIP Amendments

The following is a proposed change to the UK IAIP ENR 2 AIR TRAFFIC SERVICES AIRSPACE, and specifically to the RAF Brize Norton entry under ENR 2.1 FIR, UIR, TMA AND CTA:

Name Lateral limits Vertical limits Class of Airspace	Unit Providing Service	Callsign Language Hours of Service Conditions of Use	Frequency MHz/ Channel Purpose/ SATVOICE number	Remarks
BRIZE NORTON CTR 1 515048.08N 0012527.00W - 514832.26N 0012001.16W - 514315.91N 0011743.10W - 514033.12N 0013230.90W - 514314.00N 0015058.00W - 514552.97N 0015214.25W - 515048.08N 0012527.00W Upper limit: 6000ft ALT Lower limit: SFC Class: D BRIZE NORTON CTR 2 514314.00N 0015058.00W - 514033.12N 0013230.90W - 513930.32N 0013815.39W - 514120.40N 0015003.74W - 514314.00N 0015058.00W Upper Limit: FL105 Lower Limit: SFC Class D BRIZE NORTON RMZ/TMZ 514832.26N 0012001.16W - 514728.30N 0011728.10W -514339.48N 0011533.58W - 514315.91N 0011743.10W - 514832.26N 0012001.16W	RAF BRIZE NORTON	BRIZE ZONE English H24	119.000 MHz	Note: BUT excluding any Airspace which is within the ATZ of Oxford Aerodrome. Brize Zone frequency 119.000 MHz is for CAS transits ONLY. RAF Brize Norton Tel: 01993-897785. See below for General Information and Paragraph 2 for VRPs.

Name Lateral limits Vertical limits Class of Airspace	Unit Providing Service	Callsign Language Hours of Service Conditions of Use	Frequency MHz/ Channel Purpose/ SATVOICE number	Remarks
Upper Limit: 6000ft ALT Lower Limit: SFC Class G BRIZE NORTON CTA 1 514339.48N 0011533.58W - 513911.00N 0012629.00W - 513943.00N 0012646.00W - 514033.12N 0013230.90W - 514339.48N 0011533.58W Upper Limit: 6000ft ALT Lower Limit: 2500ft ALT Class E+ Conspicuity BRIZE NORTON CTA 2 514033.12N 0013230.90W - 513943.00N 0012646.00W - 513911.00N 0012629.00W - 513639.91N 0013011.00W- 513822.35N 0014428.06W- 514033.12N 0013230.90W Upper Limit: FL105 Lower Limit: 6000ft Class D Upper Limit: 6000ft ALT Lower Limit: 4500ft ALT				

Name Lateral limits Vertical limits Class of Airspace	Unit Providing Service	Callsign Language Hours of Service Conditions of Use	Frequency MHz/ Channel Purpose/ SATVOICE number	Remarks
Class E + Conspicuity BRIZE NORTON CTA 3 514314.00N 0015058.00W - 514120.40N 0015003.74W - 513930.32N 0013815.39W - 513822.35N 0014428.06W – 513928.00N 0015338.00W - 514314.00N 0015058.00W Upper Limit: FL105 Lower Limit: 6000ft ALT Class D Upper Limit 6000ft ALT Lower Limit:1800ft ALT Class E + Conspicuity BRIZE NORTON CTA 4 514457.50N 0015716.48W - 514314.00N 0015058.00W - 513928.00N 0015338.00W - 514457.50N 0015716.48W Upper Limit: FL125 Lower Limit: 6000ft ALT Class D Upper Limit: 6000ft ALT				

Name Lateral limits Vertical limits Class of Airspace	Unit Providing Service	Callsign Language Hours of Service Conditions of Use	Frequency MHz/ Channel Purpose/ SATVOICE number	Remarks
Lower Limit: 1800ft ALT Class E+ Conspicuity BRIZE NORTON CTA 5 514654.41N 0015443.15W - 514721.05N 0014418.61W - 514552.97N 0015214.25W - 514314.00N 0015058.00W - 514457.50N 0015716.48W - 514654.41N 0015443.15W Upper Limit: 6000ft ALT Lower Limit: 1800ft ALT Class E+ Conspicuity BRIZE NORTON CTA 6 515241.59N 0013000.15W - 515048.08N 0012527.00W - 514721.05N 0014418.61W - 514654.41N 0015443.15W - 515021.16N 0015011.66W - 515241.59N 0013000.15W Upper Limit: 6000ft ALT Lower Limit: 3000ft ALT Class E+ Conspicuity BRIZE NORTON CTA 7 515021.16N 0015011.66W - 514457.50N 0015716.48W - 514706.29N 0020508.89W				

Name Lateral limits Vertical limits Class of Airspace	Unit Providing Service	Callsign Language Hours of Service Conditions of Use	Frequency MHz/ Channel Purpose/ SATVOICE number	Remarks
- 514843.05N 0020359.72W - 515021.16N 0015011.66W Upper Limit: 7000ft ALT Lower Limit: 4500ft ALT Class E+ Conspicuity BRIZE NORTON CTA 8 514706.29N 0020508.89W - 514457.50N 0015716.48W - 513928.00N 0015338.00W - 514116.29N 0020921.76W - 514706.29N 0020508.89W Upper Limit: FL125 Lower Limit: 6000ft ALT Class D Upper Limit: 6000ft ALT Lower Limit: 5000ft ALT Class E+ Conspicuity				
	RAF BRIZE NORTON	BRIZE RADAR English 0900-1700 (1hr earlier in Summer)	124.275 MHz	

1 GENERAL INFORMATION

1.1 Brize Norton Control Zone

1.1.1 Pilots wishing to enter the Class D Control Zone (VFR or IFR) or those who wish to enter the Class E CTA IFR must observe the normal procedure for entering Controlled Airspace and should make their request for entry when 15 nm or 5 minutes flying time (whichever is earlier) from the Control Zone or Control Area Boundary. Pilots should make their request for Control Zone entry to BRIZE ZONE.

1.1.2 Pilots who wish to fly VFR within the Class E CTAs do not require an ATC Clearance. However, in order to comply with the conspicuity requirements, they must either call on BRIZE ZONE or display a Mode 3A with Mode C or Mode S transponder. Pilots are strongly advised to apply the Frequency Monitoring Code (FMC) squawk 3727 and to listen out on Brize Zone frequency or to request a Basic or Traffic service. VFR pilots are reminded of their responsibility to see and avoid IFR traffic operating within the Class E airspace.

1.1.3 Pilots are advised that holding, instrument approach and departure procedures for Brize Norton are not wholly contained within the Class D Control Zone. Therefore, those pilots that wish to fly VFR within the Class E CTAs are strongly advised to use the FMC and to listen out on BRIZE ZONE frequency, or to request a Basic or Traffic service. Additionally, due to the nature of military aircraft operations in the vicinity of Brize Norton, pilots operating in the vicinity of the Control Zone are advised to keep a good lookout for other traffic and are strongly recommended to request a Radar Service from BRIZE ZONE.

1.2 VFR Transit Flights

1.2.1 VFR flights requesting clearance to transit through the Brize Norton Control Zone may be given routing and/or altitude restrictions in order to enable VFR flights to be integrated with other traffic. Pilots should anticipate routing and/or holding instructions via the VRPs detailed in paragraph 2. Exceptionally, radar vectoring of VFR flights may be necessary for the effective integration of traffic.

1.2.2 VFR flights requiring a transit of the Class E Control Areas do not require a clearance. Pilots are reminded of the requirement to remain in VMC at all times and to comply with SERA.3105 Minimum Heights and the relevant parts of SERA.5001 VMC Visibility and Distance from Cloud Minima and SERA.5005 Visual Flight Rules. Pilots must advise ATC if at any time they are unable to comply with the ATC instructions issued.

1.3 IFR Transit Flights

1.3.1 IFR flights requesting transit through the Brize Norton Control Zone and/or Brize Norton Control Areas will be accommodated whenever possible and will normally be given clearance and may be radar vectored to provide separation from other IFR flights.

1.3.2 Exceptionally, when re-routing would be impractical, due to the nature of military operations, vertical separation between IFR flights may be reduced to 500 ft provided that the pilots have been advised of, and have agreed to, the reduced separation.

2 VISUAL REFERENCE POINTS (VRP)

2.1 In order to assist with the integration of traffic within and in the vicinity of the Brize Norton Control Zone, the following VRPs are established.

Brize Norton Control Zone			
VRP	**VOR/VOR**	**VOR/NDB**	**VOR/DME FIX**
Bampton 514330N 0013248W	CPT RDL 320° DTY RDL 212°	CPT RDL 320° BZ 126° MAG	CPT 320°/19 NM
Burford 514824N 0013812W	CPT RDL 321° DTY RDL 222°	CPT RDL 321° BZ 340° MAG	CPT 321°/25 NM
Charlbury 515218N 0012854W	CPT RDL 338° DTY RDL 217°	CPT RDL 338° BZ 032° MAG	CPT 338°/25 NM
Faringdon 513918N 0013512W	CPT RDL 306° DTY RDL 210°	CPT RDL 306° BZ 175° MAG	CPT 306°/17 NM
Farmoor Reservoir 514512N 0012124W	CPT RDL 343° DTY RDL 200°	CPT RDL 343° BZ 089° MAG	CPT 343°/17 NM
Lechlade 514136N 0014124W	CPT RDL 305° DTY RDL 217°	CPT RDL 305° BZ 225° MAG	CPT 305°/21 NM
Northleach Roundabout 515015N 0015009W	CPT RDL 313° DTY RDL 234°	CPT RDL 313° BZ 302° MAG	CPT 313°/31 NM

16 References

Re	Name	Origin
1	CAP 725 CAA Guidance on the Application of the Airspace Change Process Fourth Edition 15th March 2016 https://publicapps.caa.co.uk/docs/33/CAP%20725%20update%20March%202016%20amend.pdf	CAA
2	CAP 1616 Guidance on the regulatory process for changing the notified airspace design and planned and permanent redistribution of air traffic, and on providing airspace information Version 3 dated 22 January 2020 https://publicapps.caa.co.uk/docs/33/CAP1616_Airspace%20Change_Ed_3_Jan2020.pdf	CAA
3	Air Navigation Guidance for the CAA 2014 January 2014 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/269527/air-navigation-guidance.pdf	DfT
4	CAA Policy Statement on Flight Outside Controlled Airspace No longer available. Superseded by UK CAA Containment Policy [see Reference 5]	CAA
5	CAA DAP AIAA Review 2008 https://www.ukfsc.co.uk/files/Consultations%20CAA%20DAP/NATMAC%20Consultative%20AIAA%20Nov%202008.pdfhttps://www.caa.co.uk/uploadedFiles/CAA/Content/Standard_Content/Commercial_industry/Airspace/Airspace_change/70751064 RAF Brize Norton ACP Consultation Feedback Report Issue 1.pdf	CAA
6	RAF Brize Norton ACP Consultation Document https://www.caa.co.uk/uploadedFiles/CAA/Content/Standard_Content/Commercial_industry/Airspace/Airspace_change/20171215_BZN_ACP.pdf	MOD/Osprey
7	The UK Integrated Aeronautical Information Package (IAIP) https://www.aurora.nats.co.uk/htmlAIP/Publications/2020-06-18-AIRAC/html/index-en-GB.html	NATS/AIS
8	RAF Brize Norton Independent Scoping Study Report Version 1 Dated 27th January 2012	MOD/Atkins
9.	UK CAA Containment Policy, dated 14th January 2014 https://publicapps.caa.co.uk/docs/33/20140117ContainmentPolicyFinal.pdf	CAA
10.	RAF Brize Norton Consultation Feedback Document	MOD/Osprey

	https://www.caa.co.uk/uploadedFiles/CAA/Content/Standard_Content/Commercial_industry/Airspace/Airspace_change/70751%20064%20RAF%20Brize%20Norton%20ACP%20Consultation%20Feedback%20Report%20Issue%201.pdf	
11	RAF Brize Norton Safety Programme Plan	MOD/Osprey
12	Defence Standard (Def-Stan) 00-56 Safety Management Requirements for Defence Systems Issue 7 dated 28th February 2017	MOD
13	CAP 760 Guidance on Conduct of Hazard Identification First Edition Including Amendment 10th December 2010 https://publicapps.caa.co.uk/docs/33/CAP760.pdf	CAA
14	ICAO Annex 10 Volume 1 Radio and Navigation Aids Seventh Edition, July 2018	ICAO
15	CAP 785 Approval Requirements for Instrument Flight Procedures for use in UK Airspace Issue 1 dated 22nd March 2010 https://publicapps.caa.co.uk/docs/33/CAP785.pdf	CAA
16	ICAO PANS Ops 8168 Sixth Edition 2018	ICAO
17	CAP 670 Air Traffic Services Safety Requirements Issue 3 Amdt 1/2019 dated 7th June 2019 http://publicapps.caa.co.uk/docs/33/CAP670%20Issue3%20Am%201%202019(p).pdf	CAA

Table 6 - Table of References

17 Glossary

Acronym	Meaning
aal	Above Aerodrome Level
ACP	Airspace Change Proposal
ACAS	Airborne Collision Avoidance System
agl	above ground level
AIP	Aeronautical Information Publication
AOPA	Aircraft Owners and Pilots Association
AR	Airspace Regulation
amsl	above mean sea level
ATC	Air Traffic Control
ATE	Air Traffic Engineering
ATCO	Air Traffic Control Officer
ATSOCAS	Air Traffic Service Outside Controlled Airspace
ATS	Air Traffic Service
ATSU	Air Traffic Service Unit
BGA	British Gliding Association
BHPA	British Hand Gliding and Paragliding Association
BMAA	British Microlight Aircraft Association
CAA	Civil Aviation Authority
CAP	Civil Aviation Publication
CAS	Controlled Airspace
CAT	Commercial Air Transport
CO_2	Carbon Dioxide
CTA	Control Area (Class D UK Airspace)
DfT	Department for Transport

Acronym	Meaning
DS	Deconfliction Service
ft	feet
GA	General Aviation
GAA	General Aviation Alliance
GAT	General Air Traffic
IAIP	Integrated Aeronautical Information Package
IFP	Instrument Flight Procedure
km	kilometre
kts	knots
LARS	Lower Airspace Radar Service
LAeq	The A-weighted, equivalent sound level.
LAeq 16h	The equivalent continuous sound level in dB(A) that, over the period 23:00-07:00 hours, contains the same sound energy as the actual fluctuating sound that occurred in that period.
LoA	Letter of Agreement
m	metre
MAA	Military Aviation Authority
MoD	Ministry of Defence
NATMAC	National Air Traffic Management Advisory Committee
NATS	National Air Traffic Service *Provider of en-route air traffic services in the Scottish and London Flight Information Regions and at some civil airports*.
NERL	NATS En-Route Ltd
nm	Nautical Mile
RAF	Royal Air Force
RMZ	Radio Mandatory Zone
SARG	CAA Safety and Airspace Regulation Group

Acronym	Meaning
SSR	Secondary Surveillance Radar
TI	Traffic Information
TMZ	Transponder (SSR) Mandatory Zone
UKFSC	UK Flight Safety Committee
VFR	Visual Flight Rules
VOR	VHF Omni Directional Radio Range; a type of short-range radio navigation system for aircraft

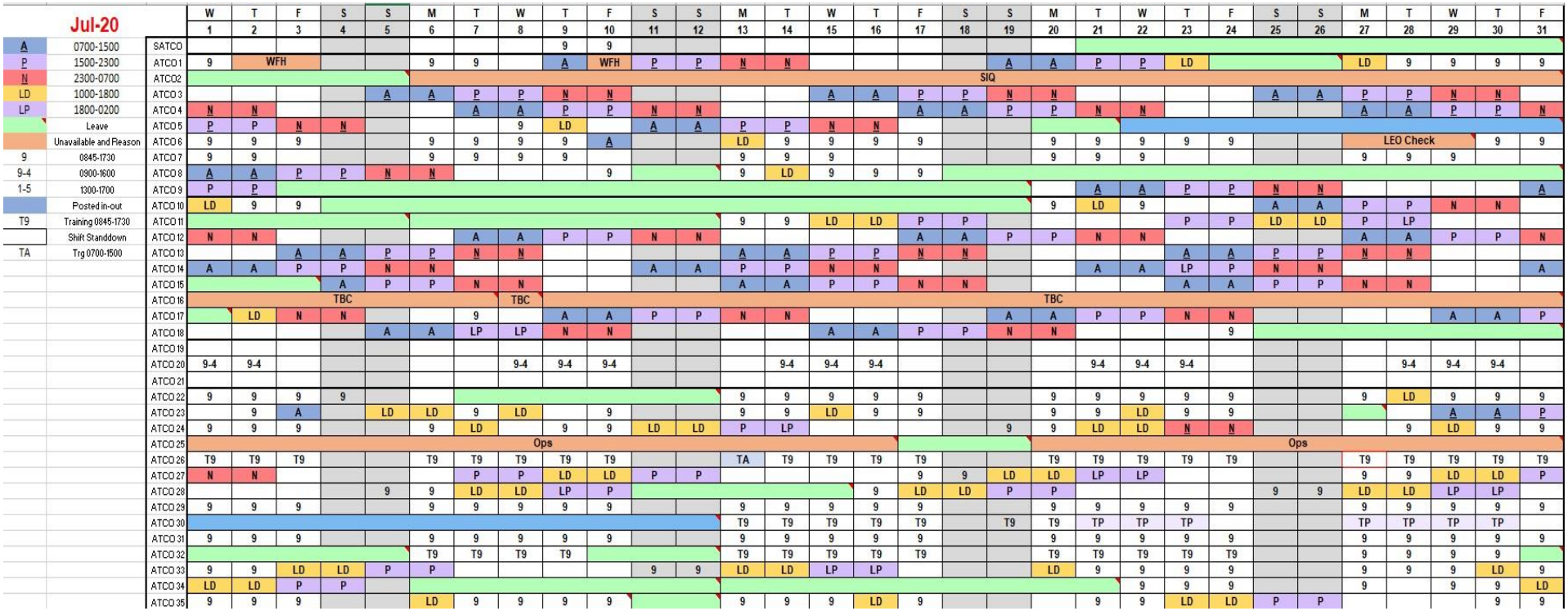
A1 Draft IFP Plates

Whilst the IFPs are not subject to approval by the CAA (they are regulated by the MAA), we have included the draft plates as the airspace design has aimed to contain the IFPs in accordance with the ICAO PANS Ops and/or the UK CAA Containment Policies.

The Draft Plates are contained for illustrative purposes within Section 10.3 of the main document.

A2 ATCO Roster

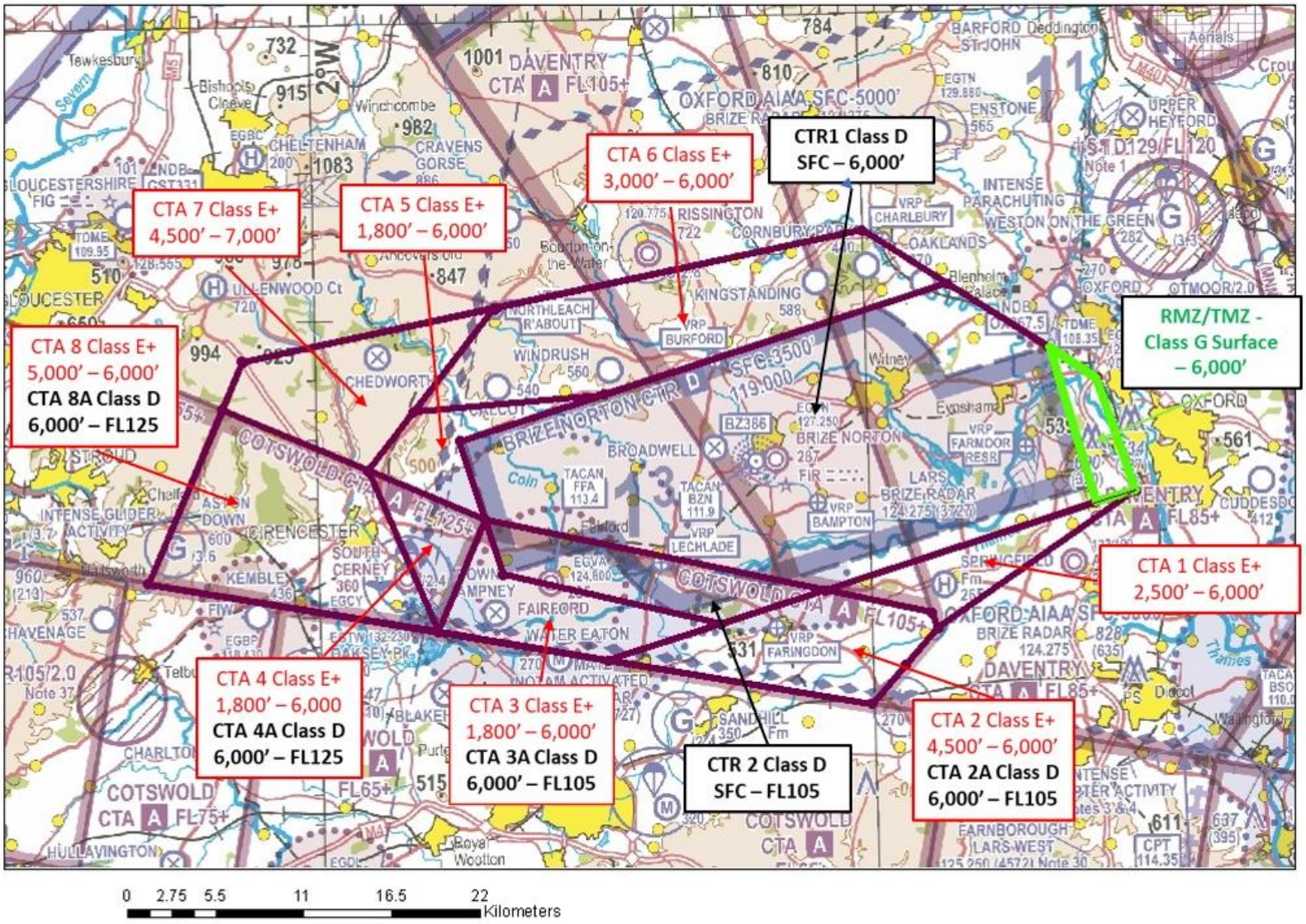
A redacted version of the RAF Brize Norton ATC Watch Roster for July 2020 is show below.

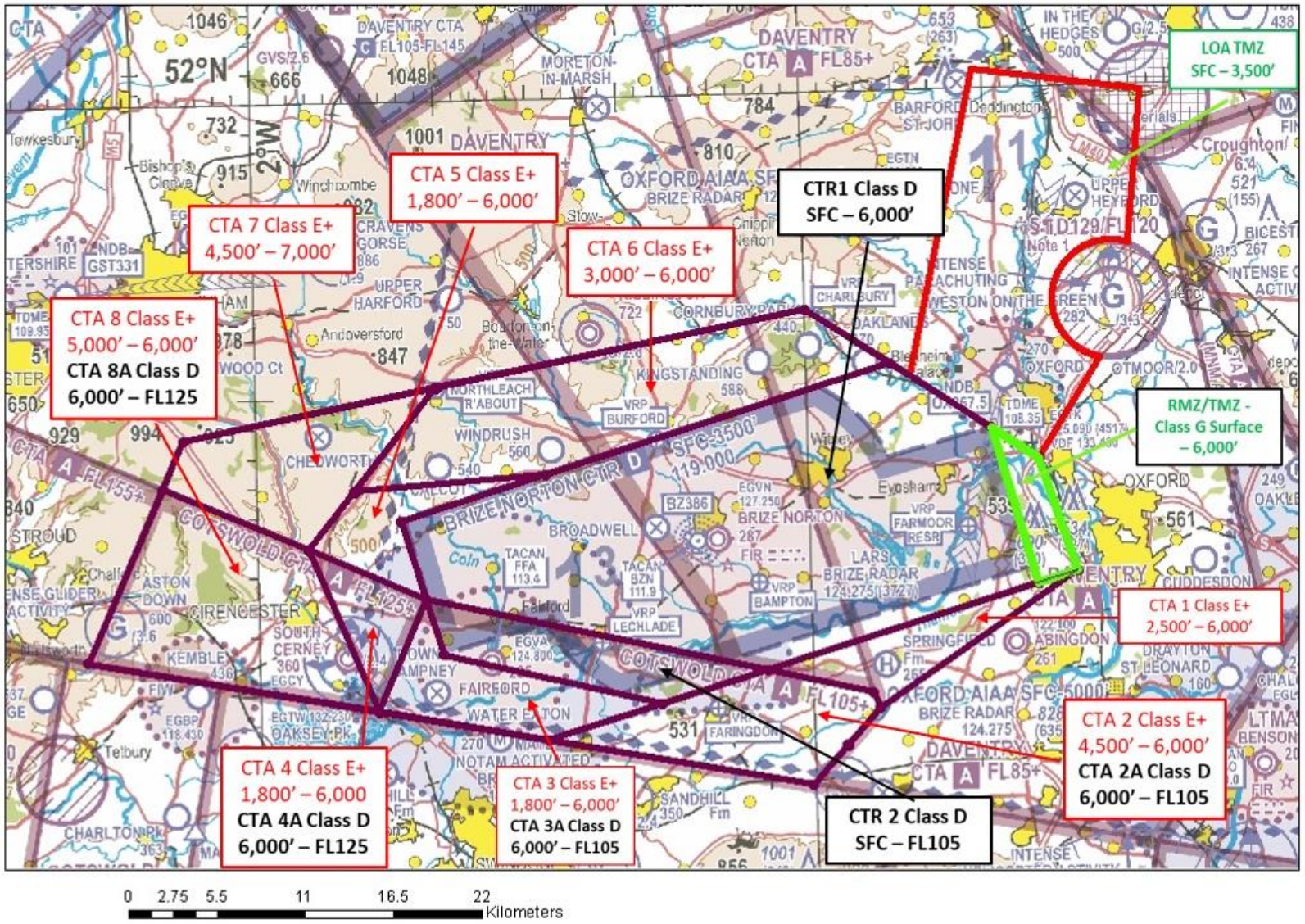


Jul-20			W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
A	0700-1500	SATCO									9	9																					
P	1500-2300	ATCO 1	9	WFH				9	9		A	WFH	P	P	N	N					A	A	P	P	LD				LD	9	9	9	9
N	2300-0700	ATCO 2						SIQ																									
LD	1000-1800	ATCO 3					A	A	P	P	N	N					A	A	P	P	N	N					A	A	P	P	N	N	
LP	1800-0200	ATCO 4	N	N					A	A	P	P	N	N					A	A	P	P	N	N					A	A	P	P	N
	Leave	ATCO 5	P	P	N	N				9	LD		A	A	P	P	N	N															
	Unavailable and Reason	ATCO 6	9	9	9			9	9	9	9	A			LD	9	9	9	9			9	9	9	9	9			LEO Check		9	9		
9	0845-1730	ATCO 7	9	9				9	9	9	9				9	9	9					9	9	9					9	9	9		
9-4	0900-1600	ATCO 8	A	A	P	P	N	N				9			9	LD	9	9	9														
1-5	1300-1700	ATCO 9	P	P																			A	A	P	P	N	N					A
	Posted in-out	ATCO 10	LD	9	9										9	9	LD	LD	P	P		9	LD	9			A	A	P	P	N	N	
T9	Training 0845-1730	ATCO 11													9	9	LD	LD	P	P					P	P	LD	LD	P	LP			
	Shift Standdown	ATCO 12	N	N					A	A	P	P	N	N					A	A	P	P	N	N					A	A	P	P	N
TA	Trg 0700-1500	ATCO 13			A	A	P	P	N	N					A	A	P	P	N	N					A	A	P	P	N	N			
		ATCO 14	A	A	P	P	N	N				A	A		P	P	N	N					A	A	LP	P	N	N					A
		ATCO 15				A	P	P	N	N					A	A	P	P	N	N					A	A	P	P	N	N			
		ATCO 16	TBC							TBC												TBC											
		ATCO 17		LD	N	N			9		A	A	P	P	N	N					A	A	P	P	N	N					A	A	P
		ATCO 18					A	A	LP	LP	N	N					A	A	P	P	N	N				9							
		ATCO 19																															
		ATCO 20	9-4	9-4						9-4	9-4	9-4				9-4	9-4	9-4					9-4	9-4	9-4					9-4	9-4	9-4	
		ATCO 21																															
		ATCO 22	9	9	9	9									9	9	9	9	9			9	9	9	9	9			9	LD	9	9	9
		ATCO 23		9	A		LD	LD	9	LD		9			9	9	LD	9	9			9	9	LD	9	9					A	A	P
		ATCO 24	9	9	9			9	LD		9	9	LD	LD	P	LP					9	9	LD	LD	N	N				9	LD	9	9
		ATCO 25	Ops																			Ops											
		ATCO 26	T9	T9	T9			T9	T9	T9	T9	T9			TA	T9	T9	T9	T9			T9	T9	T9	T9	T9			T9	T9	T9	T9	T9
		ATCO 27	N	N					P	P	LD	LD	P	P					9	9	LD	LD	LP	LP					9	9	LD	LD	P
		ATCO 28					9	9	LD	LD	LP	P							9	LD	LD	P	P				9	9	LD	LD	LP	LP	
		ATCO 29	9	9	9			9	9	9	9	9			9	9	9	9	9			9	9	9	9	9			9	9	9	9	9
		ATCO 30													T9	T9	T9	T9	T9		T9	T9	TP	TP	TP				TP	TP	TP	TP	
		ATCO 31	9	9	9			9	9	9	9	9			9	9	9	9	9			9	9	9	9	9			9	9	9	9	9
		ATCO 32						T9	T9	T9	T9				T9	T9	T9	T9	T9			T9	T9	T9	T9	T9			9	9	9	9	
		ATCO 33	9	9	LD	LD	P	P					9	9	LD	LD	LP	LP				LD	9	9	9	9			9	9	9	LD	9
		ATCO 34	LD	LD	P	P																		9	9	9			9		9	9	LD
		ATCO 35	9	9	9			LD	9	9	9	9			9	9	9	LD	9				9	9	LD	LD	P	P				9	9

A3 Airspace Design

The two images below depict the finalised RAF Brize Norton airspace design; one is depicted without the LOA proposed TMZ and the other shows both proposed airspace designs.


CTA 7 Class E+
4,500' – 7,000'
CTA 5 Class E+
1,800' – 6,000'
CTA 6 Class E+
3,000' – 6,000'
CTR1 Class D
SFC – 6,000'
RMZ/TMZ -
Class G Surface
– 6,000'
CTA 8 Class E+
5,000' – 6,000'
CTA 8A Class D
6,000' – FL125
CTA 1 Class E+
2,500' – 6,000'
CTA 4 Class E+
1,800' – 6,000
CTA 4A Class D
6,000' – FL125
CTA 3 Class E+
1,800' – 6,000'
CTA 3A Class D
6,000' – FL105
CTR 2 Class D
SFC – FL105
CTA 2 Class E+
4,500' – 6,000'
CTA 2A Class D
6,000' – FL105
0 2.75 5.5 11 16.5 22
Kilometers



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A4 Reportable Safety Events – Updated

This table has been updated since the Consultation that took place in 2017. Hyperlinks are included to the UKAB Report where applicable. Safety events involving Drones have not been included.

ASOR	Mil/Civ	Data	Date	BZN Remarks
			2012	
asor\Brize Norton - RAF\ATC - BZN\\12\18205	**AIRPROX** - GA vs GA	GA vs GA (4nm NNW of Ox) [UKAB 2012142 Risk C]	09 September 2012	BZN TS / Oxford Proc control; Gulfstream Ac above, descended through level (0', 1.5nm Horiz)
			2013	
asor\Brize Norton - RAF\ATC - BZN\A109\13\5396	**AIRPROX -** Mil vs GA	2013043 - A109 v Civ A109	29 May 2013	Civ A109 on BS whilst VMC
asor\Brize Norton - RAF\ATC - BZN\\13\7246	**AIRPROX** - Mil vs GA	2013109 - Hercules v PA28 (1800')	07 August 2013	500' coordinated above, TCAS RA down given (250' and 250m)
			2014	
asor\Brize Norton - RAF\ATC - BZN\\14\3902	**AIRPROX** - Mil vs Glider	2014041 Airprox-BDN11	15 April 2014	Boscombe Alpha jet v glider 7 miles sth of BZN

ASOR	Mil/Civ	Data	Date	BZN Remarks
asor\Brize Norton - RAF\ATC - BZN\\14\5685	**AIRPROX** - Mil vs GA	2014078 A330 vs. Civil Rotary Airprox	05 June 2014	Aircraft reported that it 'may have had an Airprox' with a civil rotary ac that was outside Brize Controlled Airspace
asor\Brize Norton - RAF\ATC - BZN\\14\7733	**AIRPROX** - GA vs GA	2014108 Dakota Airprox	13 July 2014	Dakota Airprox - not reported on frequency.
			2015	
Asor\Brize Norton\RAF\ATC – BZN\\15\5998	**AIRPROX** - Civ v Civ	2015075	21 May 2015	Penetrated Oxford ATZ
Asor\Brize Norton\RAF\ATC – BZN\\15\7421	**AIRPROX** - Civ v Civ	2015094	24 May 2015	North of Brize at 2,300', late sighting by pilots
Asor\Brize Norton\RAF\ATC – BZN\\15\7481	**AIRPROX** - Civ v Civ	2015088	10 June 2015	North of Brize at 2,200', late sighting by pilots
Asor\Brize Norton\RAF\ATC – BZN\\15\7375	**AIRPROX** - Civ v Civ	2015133	18 July 2015	North of Brize, late sighting by pilots
Asor\Brize Norton\RAF\ATC – BZN\\15\9148	**AIRPROX** - Civ v Civ	2015171	6 September 2015	North of Brize at 3,000', late sighting by pilots
			2016	

ASOR	Mil/Civ	Data	Date	BZN Remarks
Asor\Brize Norton\RAF\ATC – BZN\\16\1425	**AIRPROX** - Civ v Civ	2016004	16 January 2016	In Oxford Overhead 3,500’
Asor\Brize Norton\RAF\ATC – BZN\\16\6640	**AIRPROX** - Mil v Civ	2016090	24 May 2016	CH transit SE of BZN at 3,000’
Asor\Brize Norton\RAF\ATC – BZN\\16\8122	**AIRPROX** - Mil v Civ	2016143	23 July 2016	A400 inbound at 2,800 v Glider GH
Asor\Brize Norton\RAF\ATC – BZN\\16\8391	**AIRPROX** - Mil v Civ	2016179	31 July 2016	A400 inbound 3,800’ v unknown traffic similar lvl
Asor\Brize Norton\RAF\ATC – BZN\\16\8763	**AIRPROX** - Mil v Civ	2016165	8 August 2016	A400 BASE LEG Rwy 25 v Oxf Traffic
Asor\Brize Norton\RAF\ATC – BZN\\16\3213	Mil v Civ	TCAS RA	16 March 2016	Ctr CROSS 1,300’ v C17 descending from 2,300’
Asor\Brize Norton\RAF\ATC – BZN\\16\4492	Mil v Civ	Loss of Separation	22 April 2016	LARS transit at 4,000’ v A330 outbound at 3,800’
Asor\Brize Norton\RAF\ATC – BZN\\16\11896	Mil v Civ	TCAS RA	4 November 2016	A400 outbound v Oxf inbound (visual with A400)
			2017	

ASOR	Mil/Civ	Data	Date	BZN Remarks
Asor\Brize Norton\RAF\ATC – BZN\\17\417	**AIRPROX** - Mil v Civ	2017003	5 January 2017	CH47 low level v Oxf Inbound 1,500’
Asor\Brize Norton\RAF\ATC – BZN\\17\7786	**AIRPROX** - Mil v Civ	2017147	5 July 2017	Rotary v Glider at 3,500’
Asor\Brize Norton\RAF\ATC – BZN\\17\7483	**AIRPROX** - Mil v Civ	2017148	8 July 2017	C17 climbed out below Glider ivo NAXAT
Asor\Brize Norton\RAF\ATC – BZN\\17\1539	Mil v Civ	Separation	8 February 2017	NDB out bound v Oxf inbound at 2,300’
Asor\Brize Norton\RAF\ATC – BZN\\17\2417	Mil v Civ	TCAS RA	1 March 2017	Hold at 2,800’ v VFR transit 500’ below
Asor\Brize Norton\RAF\ATC – BZN\\17\3582	Mil v Civ	TCAS RA	28 March 2017	Base leg turn v Oxf traffic
Asor\Brize Norton - RAF\\17\5094	Separation Mil v Civ	TCAS RA	10 May 2017	C17 Vis Cct
Asor\Brize Norton\RAF\ATC – BZN\\17\6517	Mil v Civ	TCAS RA	15 June 2017	Transit at 5000’ triggered RA for a/c outbound
Asor\Brize Norton - RAF\\17\8279	Separation Mil v Civ	TCAS RA	27 July 2017	C17 Inbound v VFR transit
Asor\Brize Norton - RAF\\17\11076	Separation Mil v Civ	TCAS RA	12 October 2017	C17 Inbound v VFR transit

ASOR	Mil/Civ	Data	Date	BZN Remarks
Asor\Brize Norton - RAF\\17\11126	Separation Mil v Civ	TCAS RA	13 October 2017	A400M Inbound v VFR transit
Asor\Brize Norton - RAF\\17\6517	Separation Mil v Civ	TCAS RA	18 October 2017	A330 Inbound v VFR transit
Asor\Brize Norton - RAF\\17\7592	Separation Mil v Civ	TCAS RA	01 November 2017	C130 inbound from EGBJ
Asor\Brize Norton - RAF\\17\12001	Separation Mil v Civ	TCAS RA	06 November 2017	C17 Vis Cct v VFR transit
Asor\Brize Norton - RAF\\17\13544	Separation Mil v Civ	TCAS RA	15 December 2017	C17 Vis Cct v VFR transit
			2018	
Asor\Brize Norton - RAF\ATC - BZN\\18\380	**AIRPROX** Civ v Civ	2018007	14 January 2018	SE Brize
Asor\Brize Norton - RAF\ATC - BZN\\18\1425	**AIRPROX** Mil v Civ	2018019	11 February 2018	C17 v C182
Asor\Brize Norton - RAF\ATC - BZN\\18\3790	**AIRPROX** Civ v Civ	2018051	14 April 2018	ivo Cirencester
Asor\Brize Norton - RAF\ATC - BZN\\18\3797	**AIRPROX** Civ v Civ	2018057	21 April 2018	ivo Faringdon
Asor\Brize Norton - RAF\ATC - BZN\\18\8582	**AIRPROX** Civ v Civ	2018206	25 July 2018	S of Brize

ASOR	Mil/Civ	Data	Date	BZN Remarks
Asor\Brize Norton - RAF\ATC - BZN\\18\12398	**AIRPROX** Mil v Civ	2018302	14 November 2018	A400M v PA28
Asor\Brize Norton - RAF\\18\2833	Separation Mil v Civ	TCAS RA	21 March 2018	C130 Outbound v Transit
Asor\Brize Norton - RAF\\18\3047	Separation Mil v Civ	TCAS RA	26 March 2018	Outbound Voyager v Transit
Asor\Brize Norton - RAF\\18\3328	Separation Mil v Civ	TCAS RA	06 April 2018	C130 base turn v Oxf traffic
Asor\Brize Norton - RAF\\18\4964	Separation Mil v Civ	TCAS RA	17 May 2018	A330 Vis Cct v Inbound
Asor\Brize Norton - RAF\\18\7547	Separation Mil v Civ	TCAS RA	19 July 2018	A400M inbound v VFR transit
Asor\Brize Norton - RAF\\18\7754	Separation Mil v Civ	TCAS RA	25 July 2018	C17 inbound v transit
Asor\ASWC - BZN\\18\9776	Separation Mil v Civ	TCAS RA	17 September 2018	A400M Base turn v Oxf traffic
Asor\Brize Norton - RAF\\18\10536	Separation Mil v Civ	TCAS RA	05 October 2018	C130 base turn v Oxf traffic
Asor\Brize Norton - RAF\\18\11288	Separation Mil v Civ	TCAS RA	24 October 2018	A400M inbound v VFR transit
Asor\Brize Norton - RAF\\18\9361	Separation Mil v Civ	TCAS RA	07 November 2018	C130 inbound v VFR transit
			2019	

ASOR	Mil/Civ	Data	Date	BZN Remarks
Asor\Brize Norton - RAF\19\4043	**AIRPROX** - Mil v Civ	2019070	20 April 2019	C17 vs Glider (Inbound)
Asor\Brize Norton - RAF\ATC - BZN\\19\7314	**AIRPROX** Civ v Civ	2019096	12 May 2019	NE Brize
Asor\Brize Norton - RAF\\19\1318	Separation Mil v Mil	TCAS RA	07 February 2019	C17 inbound v VFR transit
Asor\Brize Norton - RAF\\19\3205	Separation Mil v Civ	TCAS RA	27 March 2019	A330 base turn v Oxf traffic
Asor\Brize Norton - RAF\\19\3463	Separation Mil v Mil	TCAS RA	03 April 2019	C130 outbound v Transit
Asor\Brize Norton - RAF\\19\4172	Separation Mil v Mil	TCAS RA	22 April 2019	C17 outbound v Transit
Asor\Brize Norton - RAF\\19\4561	Separation Mil v Civ	TCAS RA	02 May 2019	A400M outbound v Transit
Asor\Brize Norton - RAF\\19\4528	Separation Mil v Civ	TCAS RA	05 May 2019	A330 base turn v Oxf traffic
Asor\Brize Norton - RAF\\19\7115	Separation Mil v Civ	TCAS RA	12 July 2019	A330 base turn v Oxf traffic
Asor\Brize Norton - RAF\\19\8403	Separation Mil v Civ	TCAS RA	15 August 2019	C17 inbound v VFR transit
Asor\Brize Norton - RAF\\19\8688	Separation Mil v Civ	TCAS RA	23 August 2019	C130 hold v Transit
Asor\Brize Norton - RAF\\19\11436	Separation Mil v Mil	TCAS RA	06 November 2019	C17 vis Cct

ASOR	Mil/Civ	Data	Date	BZN Remarks
Asor\Brize Norton - RAF\\19\11951	Separation Mil v Mil	TCAS RA	20 November 2019	C17 inbound v VFR transit
			2020	
Asor\Brize Norton - RAF\\20\4394	**AIRPROX** Mil v Civ	2020040	20 May 2020	A330 vs Glider (Inbound)
Asor\Brize Norton - RAF\\20\5608	Separation Mil v Mil	TCAS RA	23 June 2020	C17 inbound v VFR transit
asor\Brize Norton - RAF\\20\6958	Separation Mil v Civ	TCAS RA	29 Jul 2020	A400M inbound v VFR transit
asor\Brize Norton - RAF\ATC - BZN\\20\7165	DZ Infringement	N/A	30 Jul 2020	Unknown vs C130 in Restricted DZ straddling CTR
asor\Brize Norton - RAF\ATC - BZN\\20\7199	DZ Infringement	N/A	30 Jul 2020	Unknown vs C130 in Restricted DZ straddling CTR