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ACP-2020-024

E-7 WEDGETAIL OPERATING AREAS



OPTIONS APPRAISAL (FULL)

V2.0



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Responsible Authors of this Document

The Change Sponsor for this Airspace Change Proposal is the Ministry of Defence (MoD). The project team is drawn from the ISTAR Force HQ.

Position	Name	Role
Project Lead	[REDACTED]	ISTAR FHQ SO2 E-7
Project Authority	[REDACTED]	Air Cap Del E-7 PM

Only responsible authors may implement amendments via the Project lead. All revisions will be listed and detailed in the table below.

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Glossary of terms

ACP	Airspace Change Proposal
ADSB	Automatic Dependent Surveillance-Broadcast
ADQ	Aeronautical Data Quality
AEW	Airborne Early Warning
AIRAC	Aeronautical Information Regulation and Control
Airprox	Air Proximity
ALARP	As Low As Reasonably Practicable
ASACS	Air Surveillance And Control System
ASIMS	Air Safety Information System
ATC	Air Traffic Control
ATS	Air Traffic Service
BGA	British Gliding Association
CAA	Civilian Aviation Authority
CAP	Civilian Aviation Publication
DA	Danger Area
DASOR	Defence Air Safety Occurrence Report
ETD	Estimated Time of Departure
FHQ	Force Head Quarters
FL	Flight Level
FRA	Free Route Airspace
FUA	Flexible Use of Airspace
GAT	General Air Traffic
ISD	In Service Date
ISTAR	Intelligence, Surveillance, Target Acquisition and Reconnaissance
LOA	Letter of Agreement
MESA	Multi-role Electronically Scanned Array
NATO	North Atlantic Treaty Organisation
NATS	National Air Traffic Services
NERL	NATS En Route plc
NM	Nautical Mile
NOTAM	Notice To Aviation
MoD	Ministry of Defence
RA	Resolution Advisory
RAF	Royal Air Force
SoN	Statement of Need
TCAS	Traffic Collision Avoidance System
TMA	Terminal Control Area
TRA(G)	Temporary Restricted Area (Gliding)
UIR	Upper Information Region
USAFE	United States Air Force Europe

Introduction

Scope

This document forms part of Stage 3 of the Airspace Change Proposal, ACP-2020-024, new Operating Areas for the E-7 Wedgetail. The MoD identified a requirement to establish new Operating Areas for the E-7 Wedgetail as the extant areas used by the RAF E-3D Sentry until Jul 2022 (and which will continue to be used by the NATO E-3A until 2035) are not suitable for E-7 operations. Whilst the E-3 flies in circular orbits (normally 15nm radius), or racetracks between 2 circular orbits, the E-7 requires a 100nm x 20nm area to operate its advanced Multi-role Electronically Scanned Array (MESA) radar. This ACP aims to introduce new E-7 Operating Areas throughout the UK that are, wherever possible, co-located with extant E-3 areas so that the E-7 can achieve its mandated Defence Tasking.

Following review of CAP 1616 by the CAA, ACP-2022-024 has transitioned to CAP 1616 V5 as a Level 3 ACP, with effect from 2 January 2024. An options appraisal is not a mandatory element of a Level 3 ACP. However, as this document has been key in demonstrating the evolution of the airspace design options, the Change Sponsor elected to submit an up-to-date version to supplement the engagement material. The aim of this document is to provide evidence that the process laid out in CAP1616 V4 was adhered to, prior to transition to CAP 1616 V5 Level 3, building on the work undertaken during the Initial Options Appraisal in Stage 2.

The timescale for the project is to establish new E-7 Operating Areas prior to the In-Service Date (ISD) of the aircraft. This was originally Q4 2023 but has been revised to Q2 2025. The Change Sponsor aims to submit the ACP to enable publication of the new operating areas in Aeronautical Information Regulation and Control (AIRAC) 2503, in order for utilisation in E-7 trials, prior to E-7 ISD.

Summary of Stage 2 Initial Options Appraisal¹

The Initial Options Appraisal appraised two options against a 'do nothing' baseline: modified E-3 areas/Danger Area (DA) complexes and dedicated E-7 areas. All 3 options are assessed in greater detail within this document, to enable clear and transparent selection of the most appropriate airspace.

¹ All documents submitted under CAP 1616 V4 can be viewed at <https://airspacechange.caa.co.uk/PublicProposalArea?pID=228>

Section 1 – Context

E-3 Airspace Baseline

1.1 The current E-3 operating areas have lateral and vertical boundaries, in which there are a series of lobes (generally 15nm radius) on which the E-3 establishes a circular orbit, or when tactical requirements demand it, 2 lobes are used to facilitate a “racetrack” or “figure 8” flight pattern. The areas are non-segregated to ensure the most efficient use of airspace possible. The areas are strategically located around the UK to enable both training with Fast Jets, predominantly in the North Sea (D323 complex), and provide optimum locations for national defence and security tasks. These operating areas are also used by the NATO E-3 Force. The operating areas are activated by Swanwick Military ATC (78 Sqn) on the day of use by a Military pre-note (Military flight plan) that is submitted approximately 2 hours prior to Estimated Time of Departure (ETD). A single Flight Level (FL) is also requested. As the airspace is non-segregated, civil traffic is able to route through the area with 78 Sqn and the Civil sector ATC providing tactical coordination. The E-3 will remain in the area at the Flight Level (FL) (normally FL310) for the duration of the task. Any change of FL or change of area is requested by the crew through 78 Sqn and will not be implemented until coordinated by both 78 Sqn and the Civil sector ATC. Only one area is routinely active at any one time. The E-3 operating areas are typically used on average 3 days a week (8-hour duration) and at weekends by exception.

1.2 The extant and proposed operating areas are all in Class C airspace. This comprises of Upper Air Routes and Free Route Airspace (see Figures 1-3 below, pages 7-8) where General Air Traffic (GAT) file flight plans. The E-3 operating areas are strategically located, wherever possible, between the Upper Air Routes. The E-3 operating areas pre-date Free Route Airspace so some conflicts occur; this should be addressed with the new E-7 operating areas. The airspace is used by both civilian and military aircraft with coordination and separation provided by civilian and military air traffic controllers. The airspace also has numerous military Danger Areas (DA), some of which are permanently active and others which become active for specific timeframes. Both civilian and military aircraft must remain clear of the active DA unless they are tasked to operate within them. There are also several other types of restricted areas in Class C airspace, notably the Temporary Restricted Airspace (Gliding) TRA (G) in Scotland that overlaps one of the current E-3 operating areas (UK-9). A Letter of Agreement (LoA) exists between the British Gliding Agency (BGA) and military/civilian air traffic control about how and when this is activated. This ensures all relevant airspace users are aware of gliders in the Upper Air and can avoid/coordinate accordingly. Airspace usage across the UK, and further afield, can be accessed via several online websites. The Change Sponsor has used historical Automatic Dependent Surveillance-Broadcast (ADS-B) information to provide baseline data on 2 of the current E-3 areas (worst case and most used) which can be viewed in the Engagement Document². In summary, the E-3 operating areas are pre-planned, pre-booked areas in Class C airspace.

² All documents are accessible via <https://airspacechange.caa.co.uk/PublicProposalArea?pid=228>

Engagement

1.3 Since submission of documents to the CAA for Stage 2, there have been numerous meetings/correspondence between the Change Sponsor and the key Stakeholder, National Air Traffic Services (NATS) En Route plc (NERL)³. Whilst the proposed E-7 operating areas have remained in approximately the same positions, there have been some amendments to limit the effect on civilian Air Traffic Services (ATS) and Free Route Airspace (FRA) routings in both the London and Scottish Upper Information Regions (UIR). These included:

- Reshaping of all the proposed E-7 operating areas from rectangular boxes to racetracks as this freed up airspace in each of the 4 corners where the E-7 could never operate. This proved significant in East Anglia (Operating Area Ref: H1) and allowed NATS to deconflict from significant reporting points/FRA routes/trajectories.
- Redefining the anchor point and orientation of one area in the southwest of England to relocate it into a single ATC sector and avoid FRA trajectories to the oceanic boundary (Operating Area Ref: I1).
- Redefining the anchor point and orientation of the area to the north of Ireland to prevent it crossing 10W into Shanwick Airspace (Operating Area Ref: K1).
- Combining 2 areas into 1 slightly larger area (Operating Area Refs: E2 and F1) to deconflict with traffic en-route to/from Copenhagen.
- Raising the base of several areas from FL270 to FL290 (Operating Area Refs: D1, E1 and E2) to deconflict with Aberdeen and Scottish Terminal Manoeuvring Area (TMA) Arrivals/Departures.
- Redefining the anchor point and size of one area in the North Sea to assist handovers to/from Copenhagen (Operating Area Ref: F1).

1.4 This engagement has refined the proposed E-7 operating areas and has ensured both NATS and the MOD have optimal use of airspace with minimal operational impact on both parties.

1.5 Discussions have also taken place with the British Gliding Association (BGA) as one of the proposed areas (D1) impacts on the Scottish TRA(G) - Areas North and South above FL240. Tactical coordination with ATC will resolve any confliction on a daily basis on the few occasions gliding occurs above FL290 (base of D1).

³ NERL are the single POC representing NATS for the ACP, acting as conduit for engagement across all applicable NATS departments

1.6 As a result of the engagement with NATS and the BGA the MOD tasked NATS to produce Aeronautical Data Quality (ADQ) compliant data for all the proposed E-7 operating areas which will ultimately be published in the requisite AIRAC amendment in early 2025.

Environmental Assessment

1.7 The Air Navigation Directions 2023 enable the CAA to disregard the environmental impacts of military aircraft when the proposal has been submitted by, or on behalf of, the MoD. However, the consequential impact from CO2 emissions of civil aircraft re-routing due to the proposed change must be assessed.

1.8 **Qualitative assessment.** The acceptance and introduction of dedicated E-7 operating areas should negate the requirement for civilian airline traffic being re-routed. The areas are non-segregated so airliners can be routed through them. Without these dedicated areas re-routing, additional track miles and increased CO2 emissions are more likely to occur. Moreover, the E-7 can climb or descend within its dedicated area to avoid civilian traffic, negating additional fuel burn by them. As a result, there should be nil/negligible net increase in CO2 emissions as a result of this ACP.

1.9 **Quantitative Modelling of CO2 emissions.** NATS were consulted over the value of investing in Quantitative Modelling to ascertain the economic and environmental differences between the extant and proposed areas. NATS Analytics team delivered the following conclusion:

The view is that it is not possible to accurately assess the environmental impact of E7 airspace and therefore it is an ineffective use of time and effort to perform any such task. The main constraining factors being:

- *The proposed airspace is not segregated from the network (and so does not affect the pre-tactical or flight planning aspects which would normally be assessed to measure any change to the current baseline)*
- *As it is only the aircraft that needs to be deconflicted from GAT, the airspace and aircraft are coordinated on a tactical basis between Mil and Civil ATC as and when required, at a mutually convenient level in the confines of the lateral airspace.*
- *The tactical nature and multiple variables at play here including multiple locations, time of day, required/requested levels, GAT / Network demand and frequency for example, adds significant complexity.*

It is our view that at best, and if even possible, any analytics would be excessively complex and unreliable to the point that the effort required would be prohibitive and any output would come with a number of CAVEATS that would make it open to challenge.

In summary the time, cost and complexity required to produce any data would not be proportionate to the change. Clearly there will be some operational impact and we

look forward to continuing our discussions on this and will, of course, provide formal feedback into the ACP process.

1.10 The Change Sponsor suggests that in line with the NATS Assessment on Quantitative Modelling, any further effort to calculate any economic impact / impact on fuel burn and CO₂ emissions is unlikely to provide any valuable or meaningful measurements and would be disproportionate to the impact itself. Moreover, as a newly categorised Level 3 ACP Quantitative assessments are not required.

1.11 In an endeavour to comply with CAA feedback, a baseline for CO₂ emissions was determined with predictions on increases/changes as a result of the implementation of the ACP. The Change Sponsor has conducted an Automatic Dependent Surveillance-Broadcast (ADSB)⁴ snapshot assessment (counting the number of ATC tracks routing through an area from historical radar data) on civilian traffic routing through two extant E-3 operating areas, then compared this with traffic over the same time period had they routed through similar proposed E-7 Operating Areas. The results of this assessment are provided in full in the Stage 3 Engagement Document of this ACP, along with a 10-year forecast on increased civilian traffic and the net effect this will have on CO₂ emissions. **The conclusion of this assessment is that that the number of civilian aircraft requiring flight path alterations either vertically or horizontally to avoid an E-7 aircraft operating is LOW. With tactical co-ordination by ATC, the actual number of alterations is more likely to be EXTREMELY LOW. Aligned with improvements in greener aviation fuels, the Change Sponsor concludes that the introduction of the new E-7 Operating areas will see nil/negligible net increase in CO₂ emissions over the next 10 years.**

Habitat Assessment

1.12 There are no changes to air traffic patterns or number of movements expected below 3000 ft due to this airspace change proposal. Therefore, iaw CAP 1616i - Habitats Regulations Assessment – Early Screening Criteria, the Change Sponsor deduces there is no requirement to assess Habitat impact.

Noise Assessment

1.13 The Department for Transport Air Navigation Guidance 2017 details the Government's altitude-based guidance.

- It states that for all changes to airspace with no impact below 7000 feet the CAA should prioritise the reduction of aircraft CO₂ emissions and the minimising of noise is no longer the priority.

As such, the Change Sponsor deduces there is no requirement to conduct a noise assessment for this ACP as the proposed airspace is above 7000 feet.

⁴ ADSB data is an aviation surveillance technology allowing aircraft position to be displayed on air traffic radars. This data can be replayed via a computer over any designated area and timeframe allowing individual aircraft to be tracked.

Safety Assessment

1.14 The proposed E-7 operating areas in this ACP have been deliberately chosen to be co-located with the extant E3 operating areas (a small number of new areas have also needed to be created). This will maintain familiarity of airspace for both the E-7 crews, Airspace Battle Managers, Air Traffic Controllers, NATS and the airline operators. Because of this familiarity, and the fact that the airspace is non-segregated, controllers will be able to co-ordinate traffic in an expeditious manner providing safe and timely coordination and deconfliction in a predictable traffic environment. Known operating areas along with Traffic Collision Avoidance System (TCAS) and the ability of the E-7 to generate its own air picture all further assure that the risk of collision is As Low as Reasonably Practicable (ALARP) and tolerable. The TCAS and MESA radar picture are already in situ on the E-7 to enable this to occur, the implementation of the dedicated operating areas is what the ACP strives to implement to complete the safe air picture.

1.15 The E-7 operating areas were deliberately constructed to be simple, of the same lateral and vertical dimensions (100nm x 20 nm racetracks between FL270 and FL350) and be non-segregated. Following engagement with NATS throughout 2023 all the areas were amended from boxes to racetracks to optimise available airspace. A few areas have also had their lateral and vertical dimensions altered to reduce the effect on ATC routings, ATC control sectors and climb out and descent profiles. This reduced complexity increases the capacity of the pilots operating in the airspace and the ATC agency providing a service. The simplicity of the new operating areas should ensure smooth, safe, and harmonious operations with both the E-7 and civilian airliners operating safely in the same predictable environment.

1.16 A safety assessment was presented with the Stage 2 Options Appraisal⁵. The Change Sponsor has also conducted a Defence Air Safety Occurrence Report (DASOR) search through the MoD Air Safety Information System (ASIMS), as well as a UK Airprox Board⁶ search for any safety incidents involving the E-3 in its operating areas, or in transit to/from its operating areas, since 2010. The search includes TCAS Resolution Advisory's (RAs)⁷. Of the 15 incidents in the UK, all but one was filed as a TCAS (RA). This incident was assessed as a Category C Airprox – no risk of collision.

- 14 Sep 10 – E-3D airprox with a Tutor aircraft. Recovery to RAF Waddington at FL85. Resolved by ATC and TCAS⁸.

⁵ The Options Appraisal submitted under CAP 1616 V4 can be viewed at <https://airspacechange.caa.co.uk/documents/download/5367>

⁶ UK Airprox Board aim to enhance air safety in the UK, in respect of lessons learned and applied from Airprox occurrences (near misses) in the UK.

⁷ TCAS Resolution Advisory is an indication given to the pilot on his instruments to climb or descend to avoid conflict with another aircraft in close proximity.

⁸ Airprox Report No 2010133.

1.17 None of the incidents included in this ASIMS search involved separation minima being eroded between the E-3D Sentry and civilian/mil traffic within the extant E3 operating areas. This validates the robust procedures already in place and the importance of known operating areas for the E-7 in the future.

Section 2 – Full Option Appraisal

2.1 In accordance with CAP 1616 V4, an Options Appraisal (Phase I)⁹ was carried out in Stage 2, with the intent to be developed further by providing quantitative details where required for each shortlisted option¹⁰, including the ‘do nothing’ option. The decision between creating modified E-7 Operating Areas/DA complexes or establishing new dedicated E-7 Operating Areas was assessed against the ‘do nothing’ option based on the SoN:

Statement of Need

2.2 Currently the E-3D Sentry Airborne Early Warning (AEW) Mk 1 utilises the UK AEW areas for UK training and operations. In 2023¹¹ the E-7 Airborne Early Warning Wedgetail Mk 1 will enter RAF service. Though fulfilling the same role as the Sentry, advances in technology mean that the Wedgetail will not be able to utilise exactly the same orbit areas. The Wedgetail will be required to fly approximately 100 nm by 20 nm racetracks. Best use can be made of some of the existing operating areas (e.g. UK 1, 7 and 9) as they are both large enough to accommodate the Wedgetail flight profile and are appropriately located to enable Wedgetail to provide a service to its forecast traffic and trade. The existing operating areas may still be utilised by NATO/visiting forces partners as the UK will retain its NATO commitment in this respect. Therefore, whilst the extant operating areas must remain in place for the time-being, there is a requirement for new operating areas to be created where the current areas are not sufficient.

Design Principles

2.3 At Stage 1 the Change Sponsor, with feedback from Stakeholders, established a set of Design Principles in which to guide the airspace design options. The design principles agreed at the Stage 1 and 2B Gateway are as follows:

DP ID	Agreed Design Principle
a	Must be safe. The defined airspace must provide ATS providers a known traffic environment to ensure safe separation against GAT.
b	Defined areas must be sufficient in location to achieve training and operational objectives.
c	Defined areas must be the minimum dimension to achieve task.
d	Minimise the impact to Commercial Air Traffic flow, sector complexity and sector capacity.
e	Airspace management and Flexible Use of Airspace (FUA) principles will be applied to ensure collaborative decision-making protocols and management processes are established.

⁹ The Stage 2 Options Appraisal can be viewed at [Airspace change proposal public view \(caa.co.uk\)](https://caa.co.uk/airspace-change-proposal-public-view)

¹⁰ NB: A Quantitative assessment is no longer required under CAP 1616 V5 but had already commenced before ACP re-categorisation to Level 3

¹¹ E-7 In Service Date (ISD) has moved to Q2 2025.

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f	Defined areas shall not be segregated airspace but will align to current or revised procedures detailed within current NATS/MOD interface documents.
g	The defined areas will detail the separation standard required between GAT and the OAT using the designated area.
h	The design shall seek to rationalise existing areas where appropriate.
i	The design shall minimise the impact on all ATM stakeholders. This will include NATS and other Air Navigation Service Providers (ANSPs) (including foreign ANSPs) so as not to over complicate airspace, sector design and service provision.

Option 0 – Do Nothing – Operate in Extant E-3 Operating Areas

2.4 This option is included for comparison purposes only. The extant E-3 operating areas will continue to be used by the NATO E-3 force until 2035. E-7 operations could be conducted within these areas but would significantly affect the operation/capability of the E-7 MESA radar and restrict the ability of the MOD to conduct its training and operational defence tasks.

Note 1: Figures 1-3 divide the UK into North, Central and South regions. This is solely for ease of viewing of the chart in this document and there are no designated North, Central and South AEW Areas. Areas are designated A1, A2, B2 etc.

Note 2: The charts are for illustrative purposes and are based on the ENR6-70 [eAIS Package United Kingdom \(nats.co.uk\)](https://www.nats.co.uk).

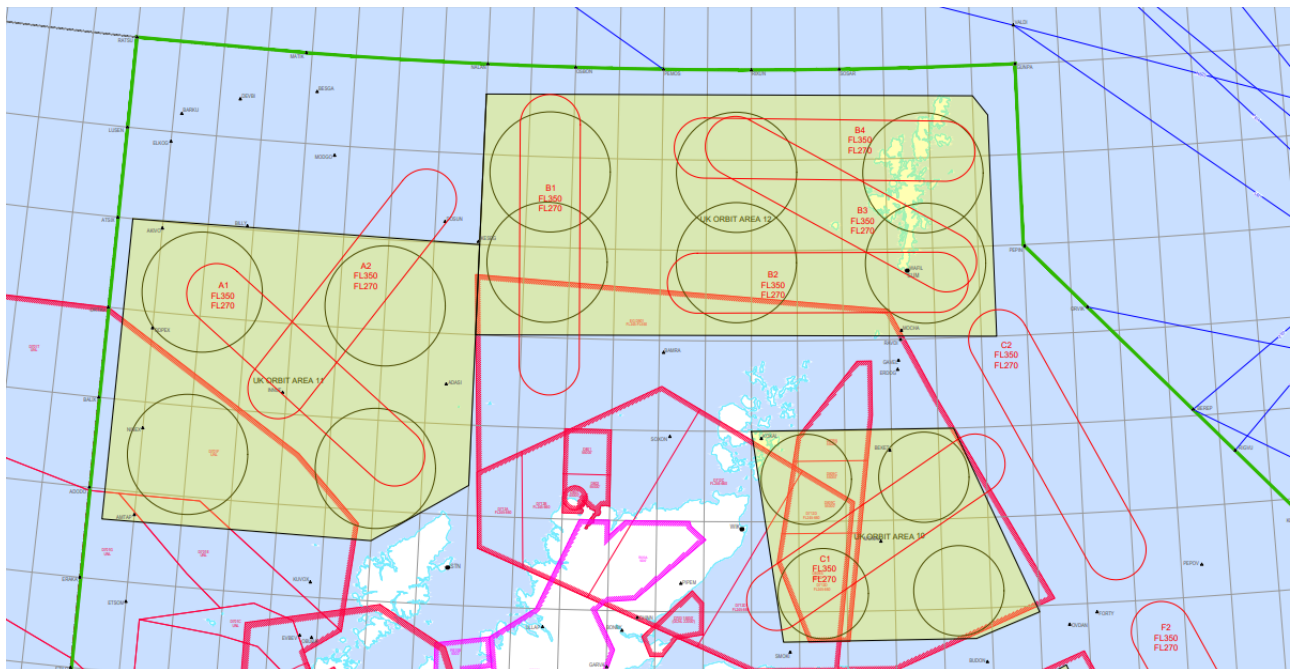


Figure 1 – Extant E-3 Operating Areas North (highlighted in yellow including individual circular lobes) with proposed new Operating Areas overlaid in red (racetracks).

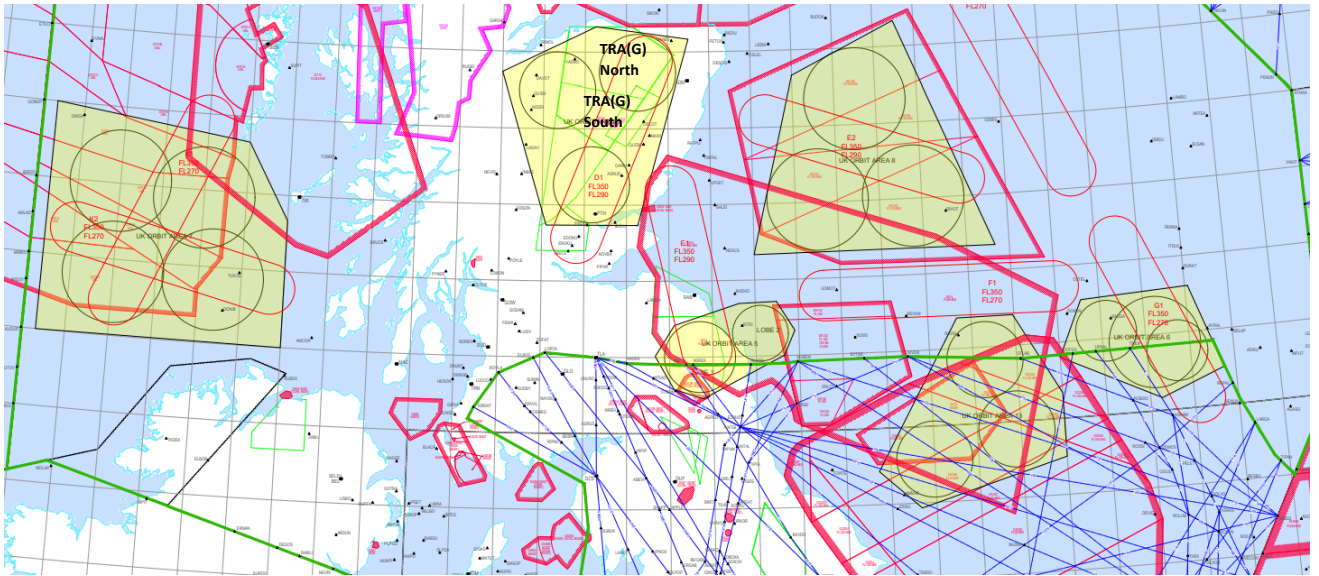


Figure 2 – Extant E-3 Operating Areas Central (highlighted in yellow including individual circular lobes) with proposed new Operating Areas overlaid in red (racetracks).

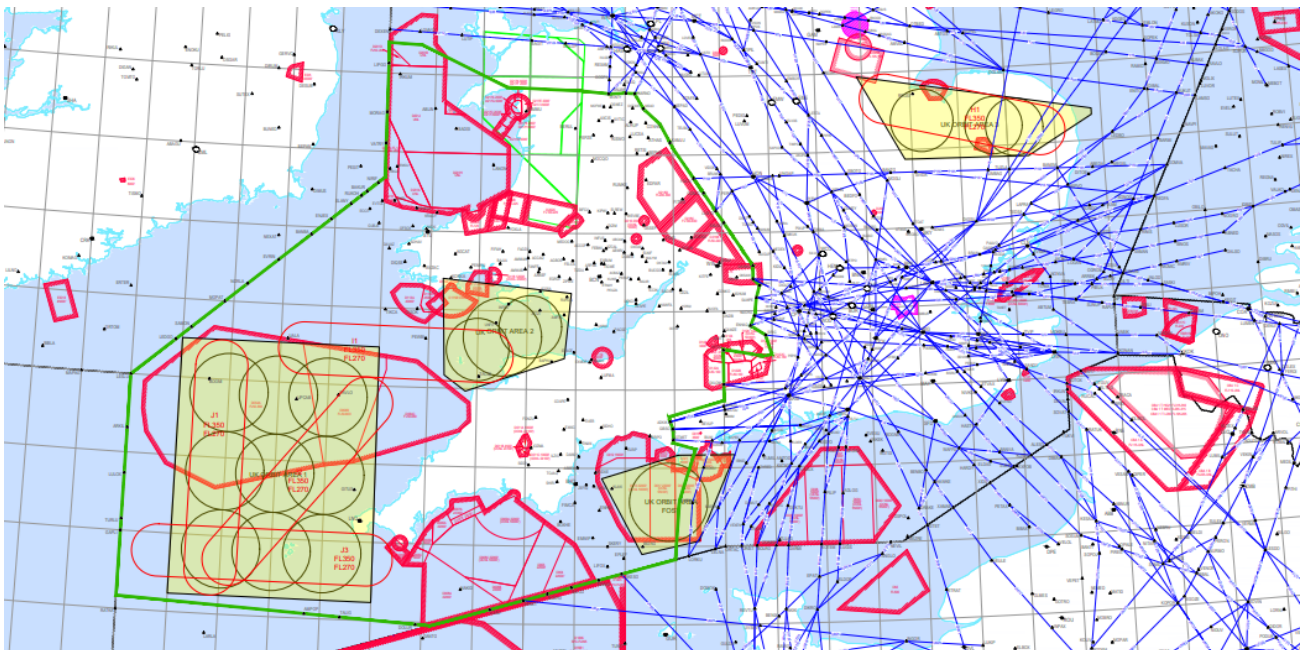


Figure 3 – Extant E-3 Operating Areas South (highlighted in yellow including individual circular lobes) with proposed new Operating Areas overlaid in red (racetracks).

Summary of Option 0 Full Appraisal

2.5 Option 0, the do-nothing option, aimed to examine whether alternatives existed which would still allow the RAF Air Surveillance and Control System (ASACS) force to conduct their training and operational tasks in accordance with the SoN. The ability to continue to operate in the extant E-3 areas would place limitations on the new surveillance radar and ultimately affect the radar picture and level of safe control that the aircraft could provide to other air systems. This would result in an inability to meet specific Defence Tasks mandated to the ASACS force. Option 0 meets 7 of the 9 Design Principles but not 2 important ones as follows:

- (b) Defined areas must be sufficient in location to achieve training and operational objectives.
- (c) Defined areas must be the minimum dimension to achieve task.

As a result, ongoing Defence Tasks could not be achieved to the same level of intricacy as they are currently; safe and secure radar coverage of UK airspace could not be guaranteed, and safe control of other air systems would be put at risk. This clearly articulates the requirement for new dedicated E-7 airspace.

Option 1 – Do Minimal – Operate in DA Complexes and modified E-3 Areas

2.6 This will limit the operational effectiveness of the E-7 Wedgetail sensor, hindering its ability to fulfil defence tasks. In many instances, operation outside of the extant E-3 orbits/modified operating areas would be required as the current areas are too small. Operation in DA is also restrictive with many in the wrong location, too small or allocated to other military aircraft for training. Use of modified areas/DA complexes would reduce predictability and planning for other airspace users, increase complexity and workload for ATS units and limit the tactical effectiveness of the E-7. Moreover, the unpredictability of operating areas could lead to airliners encountering route deviations with additional track miles being flown and increased CO2 emissions being emitted.

Summary of Option 1 Full Appraisal

2.7 Option 1, the do minimum option, aimed to examine whether alternatives existed which would still allow the RAF Air Surveillance and Control System (ASACS) force to conduct their training and operational tasks in accordance with the SoN. The ability to continue to operate in modified E-3 areas/DAs would place limitations on the new surveillance radar and ultimately affect the radar picture and level of safe control that the aircraft could provide to other air systems. This would result in an inability to meet specific Defence Tasks mandated to the ASACS force. Moreover, the unpredictability of operating areas could lead to airliners encountering route deviations, additional track miles being flown and therefore increased CO2 emissions. Option 1 meets 6 of the Design Principles but not 3 important ones as follows:

- (b) Defined areas must be sufficient in location to achieve training and operational objectives.
- (c) Defined areas must be the minimum dimension to achieve task.
- (f) Defined areas shall not be segregated airspace but will align to current or revised procedures detailed within current NATS/MOD interface documents.

As a result, ongoing Defence Tasks could not be achieved to the same level of intricacy as they are currently; safe and secure radar coverage of UK airspace could not be guaranteed, and safe control of other air systems would be put at risk. This clearly articulates the requirement for new dedicated E-7 airspace.

Option 2 – Create Dedicated E-7 Operating Areas

2.8 Option 2 is to create dedicated E-7 Operating Areas. This will ensure the E-7 MESA radar can operate in its optimal modes and as such be able to conduct operations and training to its full effect thus meeting all its Defence Tasks.

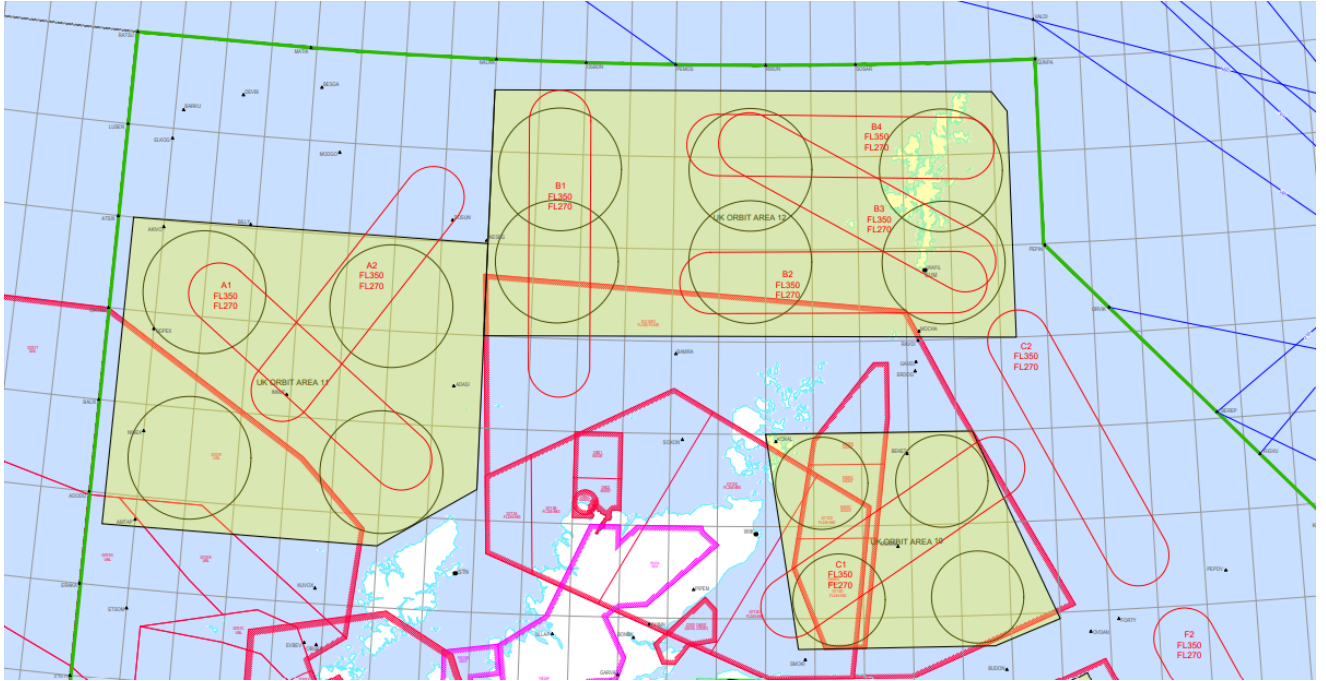


Figure 4 – Proposed New Operating Areas North (red racetracks)

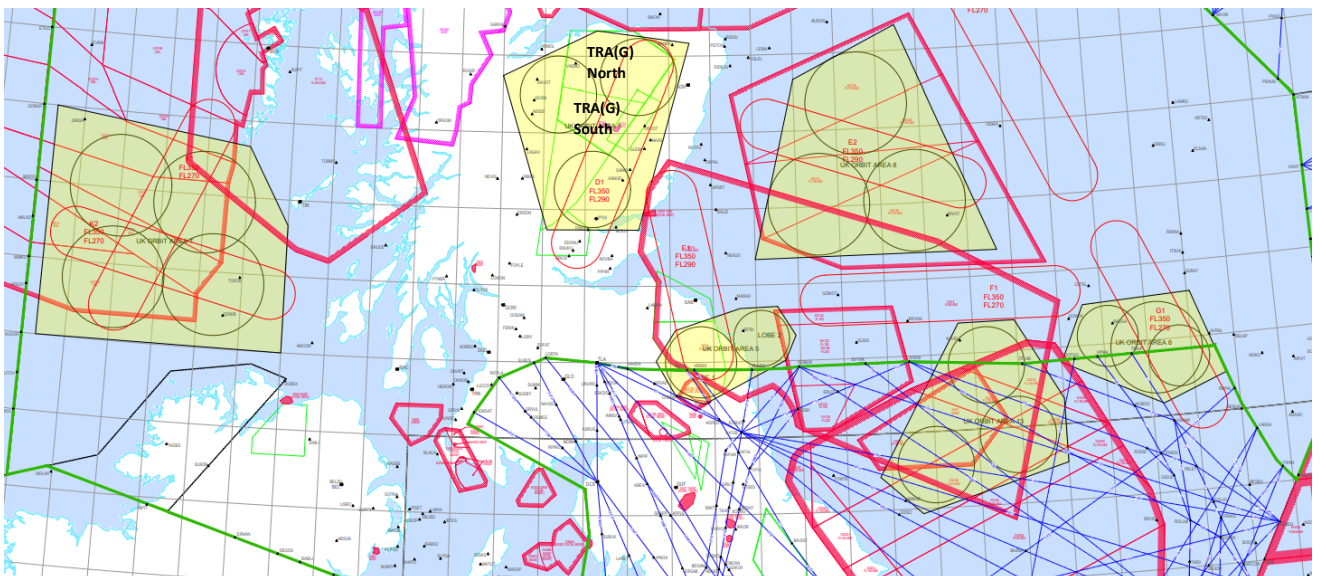


Figure 5 – Proposed New Operating Areas Central (red racetracks)

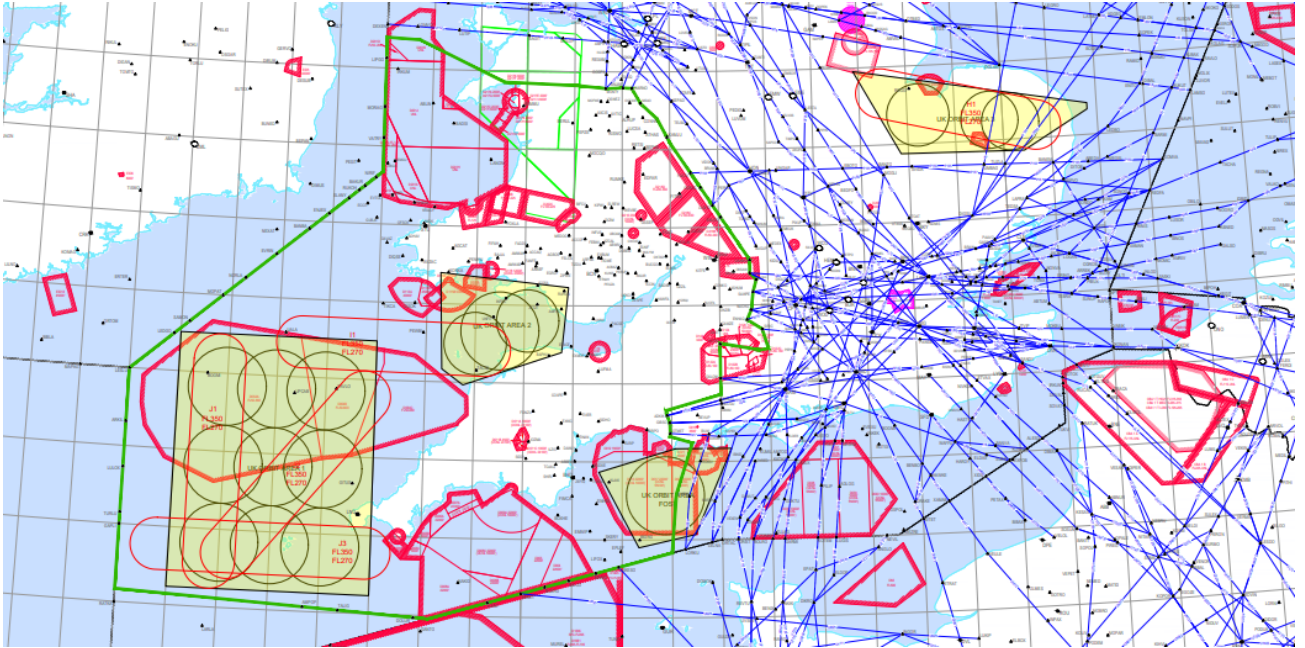


Figure 6 – Proposed New Operating Areas South (red racetracks)

Summary of Option 2 Full Appraisal

2.9 Option 2, create dedicated E-7 Operating Areas aimed to produce the best solution with respect to airspace in which the E-7 Wedgetail could operate in order to allow the RAF ASACS force to conduct their training and operational tasks in accordance with the SoN. As a result of engagement with the key stakeholders this option also has minimal effect on civil traffic and would produce nil/negligible additional CO2 emissions by airliners requiring tactical re-routing. **This Option meets all 9 of the Design Principles. As such, Option 2 is the preferred option of the Change Sponsor.**

Options Comparison Table

Group	Impact	Level of Analysis
Communities	Noise impact on health and quality of life	Qualitative
Evidence Analysis		
Do-nothing (Option 0)	Do-minimum (Option 1)	E-7 Areas (Option 2)
The operating heights of the extant E-3 areas are FL270-FL350. It is therefore assessed that there would be no noise impact on health and quality of life to communities. Moreover, the vast majority of the areas are located over the sea and therefore communities are not affected - this metric is outside the scope of this ACP.	The operating heights of the modified E-3 areas/DA complexes are FL270-FL350. It is therefore assessed that there would be no noise impact on health and quality of life to communities. Moreover, the vast majority of the areas are located over the sea and therefore communities are not affected - this metric is outside the scope of this ACP.	As a Level 3, CAP1616 states that for aircraft above 7,000 feet, the prioritised environmental impact is CO2 emissions, and an assessment of noise impacts is not normally required. This proposal has the base of the E-7 operating areas at FL270, which will significantly reduce/mitigate all noise effects on the ground. Noise impacts were not a concern in any of the stakeholder engagement that was carried out prior to Stage 3. Moreover, the majority of the proposed areas are over the sea and would therefore not affect communities. This metric is outside the scope of this ACP.
Group	Impact	Level of Analysis
Communities	Air Quality	Qualitative
Evidence Analysis		
Do-nothing (Option 0)	Do-minimum (Option 1)	E-7 Areas (Option 2)
The operating heights of the extant E-3 areas are FL270-FL350. It is therefore assessed that there would be no detrimental impact on air quality to communities in any of the geographical areas. Moreover, the vast majority of the areas are located over the sea and are therefore not affected - this metric is outside the scope of this ACP.	The operating heights of the modified E-3 areas/DA complexes are FL270-FL350. It is therefore assessed that there would be no detrimental impact on air quality to communities in any of the geographical areas. Moreover, the vast majority of the areas are located over the sea and are therefore not affected - this metric is outside the scope of this ACP.	The operating heights of the proposed E-7 operating areas are FL270-FL350. It is therefore assessed that there would be no detrimental impact on air quality to communities in any of the geographical areas. Moreover, the vast majority of the areas are located over the sea and are therefore not affected - this metric is outside the scope of this ACP.

Group	Impact	Level of Analysis
Wider Society	Greenhouse gas impact	Qualitative
Evidence Analysis		
Do-nothing (Option 0)	Do-minimum (Option 1)	E-7 Areas (Option 2)
With continued use of the E-3 operating areas civil traffic could be routed in advance to avoid them or be allocated a transit FL that negates a climb or descent to transit through them (non-segregated airspace). This would result in nil/negligible additional fuel burn and have a nil/negligible increase in greenhouse gas impact. Moreover, there are 13 E-3 operating areas. On the vast majority of occasions only one operating area will be active so impact to civil traffic across the vast majority of the UK will be unchanged. Finally, operations over the weekend are by exception resulting in no change to civil traffic routings over this 48-hour period and therefore no change to CO2 emissions.	With use of modified E-3 operating areas/DA complexes civil traffic may encounter some tactical route deviations (dimensions of modified areas not known in advance/random areas). This may result in additional track miles, additional fuel burn and an increase in greenhouse gas impact. Of note, and in mitigation, the E-7 can climb or descend to ensure civil traffic can maintain their allocated FL through the operating area (if outside a DA complex) – this presents minimal degradation to the radar picture for a short duration climb/descent. Moreover, there are 13 E-3 operating areas (modified areas). On the vast majority of occasions only one operating area will be active so impact to civil traffic across the vast majority of the UK will be unchanged. Finally, operations over the weekend are by exception resulting in no change to civil traffic routings over this 48-hour period and therefore no change to fuel burn.	With dedicated E-7 operating areas civil traffic could be tactically routed in advance to avoid them or be allocated a transit FL that negates a climb or descent to transit through them (non-segregated airspace). This would result in nil/negligible additional fuel burn and have a nil/negligible increase in greenhouse gas impact. Moreover, there are 21 proposed E-7 operating areas. On the vast majority of occasions only one operating area will be active so impact to civil traffic across the vast majority of the UK will be unchanged. Finally, operations over the weekend are by exception resulting in no change to civil traffic routings over this 48-hour period and therefore no change to CO2 emissions.
Group	Impact	Level of Analysis
General Aviation	Access	Qualitative
Evidence Analysis		
Do-nothing (Option 0)	Do-minimum (Option 1)	E-7 Areas (Option 2)
The operating heights within the extant E-3 operating areas are in the band FL270-FL350. It is therefore assessed that	The operating heights of the modified E-3 areas/DA complexes are in the band FL270-FL350. It is therefore	The operating heights of the proposed E-7 operating areas are in the band FL270-FL350. It is therefore assessed that there

there would be minimal impact on General Aviation. The only identified exceptions are the BGA who can operate above FL240 in the TRA(G) Scottish Areas North and South from several gliding sites. On the occasions that one of these areas is active and conflicts with an E-3 orbit ATC co-ordination or a change of E-3 orbit is instigated. LoA exists to activate TRA(G).	assessed that there would be minimal impact on General Aviation. The only identified exceptions are the BGA who can operate above FL240 in the TRA(G) Scottish Areas North and South from several gliding sites. On the occasions that one of these areas is active and conflicts with an E-3 orbit ATC co-ordination or a change of E-3 orbit is instigated. LoA exists to activate TRA(G). Moreover, General Aviation would be excluded from DA complexes when they are activated by NOTAM. This represents no change to extant avoidance of active DA complexes.	would be minimal impact on General Aviation. The only identified exceptions are the BGA who can operate above FL240 in the TRA(G) Scottish Areas North and South from several gliding sites. On the occasions that one of these areas is active and conflicts with an E-7 orbit (D1 - Base FL290) ATC co-ordination or a change of E-7 orbit can be instigated. LoA that exists to activate TRA(G) to be reviewed and amended. This issue was identified and raised by the British Gliding Association (BGA) during Stage 2.
Group	Impact	Level of Analysis
General Aviation/Commercial Airlines	Economic impact from increased effective capacity	Qualitative
Evidence Analysis		
Do-nothing (Option 0)	Do-minimum (Option 1)	E-7 Areas (Option 2)
Outside the scope of this ACP.	Outside the scope of this ACP.	Outside the scope of this ACP.
Group	Impact	Level of Analysis
Commercial Airlines	Fuel Burn	Qualitative
Evidence Analysis		
Do-nothing (Option 0)	Do-minimum (Option 1)	E-7 Areas (Option 2)
With continued use of the E-3 operating areas civil traffic could be routed in advance to avoid them or be allocated a transit FL that negates a climb or descent to transit through them (non-segregated airspace). This would result in negligible additional fuel burn. Also, the E-3 can climb or descend to ensure civil traffic can maintain their allocated FL through the operating area – this presents minimal	With use of modified E-3 operating areas/DA complexes civil traffic may encounter some tactical route deviations (dimensions of modified areas not known in advance/random areas). This would result in additional track miles, additional fuel burn and an increase in greenhouse gas impact. Of note, and in mitigation, the E-3 can climb or descend to ensure civil traffic can maintain their	With dedicated E-7 operating areas civil traffic could be tactically routed in advance to avoid them or be allocated a transit FL that negates a climb or descent to transit through them (non-segregated airspace). This would result in nil/negligible additional fuel burn. Also, the E-7 can climb or descend to ensure civil traffic can maintain their allocated FL through the operating area – this presents minimal degradation to the radar picture for a short duration

degradation to the radar picture for a short duration climb/descent. Moreover, there are 13 E-3 operating areas. On the vast majority of occasions only one operating area will be active so impact to airlines across the vast majority of the UK will be unchanged. Finally, operations over the weekend are by exception resulting in no change to civil traffic routings over this 48-hour period and therefore no change to fuel burn.	allocated FL through the operating area (if outside a DA complex) – this presents minimal degradation to the radar picture for a short duration climb/descent. Moreover, there are 13 E-3 operating areas (modified areas). On the vast majority of occasions only one operating area will be active so impact to civil traffic across the vast majority of the UK will be unchanged. Finally, operations over the weekend are by exception resulting in no change to civil traffic routings over this 48-hour period and therefore no change to fuel burn.	climb/descent. Moreover, there are 21 proposed E-7 operating areas. On the vast majority of occasions only one operating area will be active so impact to civil traffic across the vast majority of the UK will be unchanged. Finally, operations over the weekend are by exception resulting in no change to civil traffic routings over this 48-hour period and therefore no change to fuel burn.
Group	Impact	Level of Analysis
Commercial Airlines	Training Costs	Qualitative
Evidence Analysis		
Do-nothing (Option 0)	Do-minimum (Option 1)	E-7 Areas (Option 2)
No additional training costs to commercial airlines as a result of using the extant E-3 operating areas.	No additional training costs to commercial airlines as a result of using modified E-3 areas/DA complexes.	No additional training costs for commercial airlines as the service provided is unchanged, with standard separation being provided against all known traffic. Commercial pilots are unlikely to be familiar with the current arrangements for E3s so using the same procedures for E7 is as equally unknown to them.
Group	Impact	Level of Analysis
Commercial Airlines	Other Costs	Qualitative
Evidence Analysis		
Do-nothing (Option 0)	Do-minimum (Option 1)	E-7 Areas (Option 2)
No additional costs to commercial airlines as a result of using the extant E-3 operating areas.	No additional costs to commercial airlines as a result of using modified E-3 operating areas/DA complexes.	No additional costs to commercial airlines as a result of using this airspace option.
Group	Impact	Level of Analysis

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Airport / Air Navigation Service Provider	Infrastructure costs	Qualitative
Evidence Analysis		
Do-nothing (Option 0)	Do-minimum (Option 1)	E-7 Areas (Option 2)
No additional infrastructure costs to airports or air navigation service providers as a result of using the extant E-3 operating areas.	No additional infrastructure costs to airports or air navigation service providers as a result of using modified E-3 operating areas/DA complexes.	No additional infrastructure costs to airports or air navigation service providers as a result of using this airspace option.
Group	Impact	Level of Analysis
Airport / Air Navigation Service Provider	Operational Costs	Qualitative
Evidence Analysis		
Do-nothing (Option 0)	Do-minimum (Option 1)	E-7 Areas (Option 2)
No additional operational costs to airports or air navigation providers as a result of using the extant E-3 operating areas.	No additional operational costs to airports or air navigation providers as a result of using modified E-3 operating areas/DA complexes.	No additional operational costs to airports or air navigation providers as a result of using this airspace option.
Group	Impact	Level of Analysis
Airport / Air Navigation Service Provider	Deployment Costs	Qualitative
Evidence Analysis		
Do-nothing (Option 0)	Do-minimum (Option 1)	E-7 Areas (Option 2)
No additional deployment costs to airports or air navigation service providers as a result of using the extant E-3 operating areas.	No additional deployment costs to airports or air navigation service providers as a result of using modified E-3 operating areas/DA complexes.	No additional deployment costs to airports or air navigation service providers. Radar maps and charts will be updated in line with the AIRAC cycle.

Criteria Applicable to all Options

Frequency of Activation

2.10 As detailed in Stage 2A, it is expected that E-7 area activation will be in support of one sortie per day for a period of approximately 8 hours. During a sortie, an E-7 may use more than one area. It is assessed that UK East Coast areas will be used more than those elsewhere in the UK due to training requirements and support provided to RAF and United States Air Force Europe (USAFE) fast jet training. Weekend activation is only likely to be for major exercise activity or for national security requirements.

10 Year Forecast

2.11 The Change Sponsor conducted a 10-year forecast to assess airline growth and the effect it will have on the ACP. The baseline scenario data below from the Eurocontrol Aviation Outlook 2050 report shows growth of +44% between 2019 and 2055. Assuming linear growth between these dates (+1.42% per year) the Change Sponsor assesses growth to be 14.2% over the next 10-year period.

ECAC	IFR flights						
	2019		2050			2050/2019	
	Total (million)	Avg. daily (thousands)	Total (million)	Avg. daily (thousands)	Extra flights/day (thousands)	Total growth	AAGR
High scenario	11.1	30.4	19.6	53.6	23.2	+76%	+1.8%
Base scenario			16.0	43.7	13.4	+44%	+1.2%
Low scenario			13.2	36.2	5.8	+19%	+0.6%

Data from Eurocontrol Aviation Outlook 2050 Report

2.12 The Change Sponsor conducted a survey using historical Automatic Dependent Surveillance Broadcast (ADS-B) data to ascertain traffic density in two E-3 operating areas. The average number¹² of civilian airline aircraft transiting the two

¹² Figures are rounded to nearest whole number for practical reflection of number of aircraft.

selected E-3 operating areas (UK3 (East Anglia) and UK6 (North Sea)¹³) was approximately 4 per hour. With a growth rate of +14.2% over 10 years the number of potential airline traffic per hour would increase to approximately 5. Again, it should be noted that the E-7 can alter its operating Flight Level to negate the requirement for civilian airline aircraft to change route/height or can relocate to another area if civilian traffic density is particularly high.

2.13 Thus, the Change Sponsor assesses by comparison, that in the future, with tactical co-ordination by ATC, there would be little or no impact to civilian airline traffic. Therefore, the new E-7 Operating areas will not generate increases in CO2 emissions over the next 10 years.

Summary Economic Assessment

2.14 This ACP proposes the establishment of new E-7 airspace, alongside existing E-3 operating areas. Given that the operation of this airspace will not be significantly different from that of the existing E-3 areas it is assessed that there will be no economic costs incurred beyond those already budgeted for on an annual basis, in summary no financial change to the extant baseline option. Furthermore, as the airspace vertical limits are FL270 - FL350, no economic costs (such as training and logistical) should be incurred by airports, Air Navigation Service Providers, or airlines, other than radar maps and charts updated in line with the AIRAC cycle.

¹³ See section 3.7 Baseline Environmental Data in Engagement document v2.0

Section 3 – Conclusion

Summary

3.1 Option 0 ‘Do nothing’ and Option 1 ‘Do minimum’ are presented as comparisons against Option 2 ‘Dedicated E-7 Areas’ as they do not satisfy the Design Principles agreed in Stage 1. **Therefore Option 2 remains the preferred option of the Change Sponsor.**

3.2 It is assessed that the introduction of dedicated E-7 operating areas will have no environmental impact on communities and little or no environmental or economic impact on commercial airliners and other aviation Stakeholders. It is assessed that that this ACP will only have a limited impact on a small number of key stakeholders (NATS and BGA).

ACP Timeline

3.3 The Change Sponsor will enter targeted engagement on 3 Jun 2024.

3.4 The following CAP1616 timeline is anticipated:

Stage/Step	Description	Gateway Date
3	Targeted Engagement Launch	3 June 2024
3	Reminder to Stakeholders	1 July 2024
3	Collate and review responses from targeted engagement.	14 July 2024
4	Produce submission	September 2024
4	Submit Airspace Proposal to the CAA	October 2024
5	DECIDE	January 2025
6	IMPLEMENT into AIRAC	May 2025

3.5 The Change Sponsor will continue the ACP process in accordance with the timeline agreed, submitting all required documentation at Stage 4 in order to allow the CAA to reach a decision in January 2025.