Future Airspace Strategy Implementation North (FASI-N)

Scottish Terminal Manoeuvring Area (ScTMA)

ACP-2019-74

Gateway documentation:

Stage 2 Develop and Assess

Step 2A document

Design Options and Evaluation

V1.1

NATS Public

Roles

Action	Role	Date
Produced	Airspace Change Specialist NATS Airspace Change Compliance & Delivery	March 2022
Reviewed Approved	Manager Airspace Change Compliance & Delivery	April 2022
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Drafting and Publication History

Issue	Month/Year	Changes this issue
0.3	March 2022	First Draft for internal NERL review
1.0	April 2022	Version submitted to CAA for Stage 2 (May 2022) Gateway
1.1	May 2022	Following CAA Gateway feedback the following has been updated: • Illustration of number of flights section updated: o To include 2019 data source o To include a statement that the 2019 data is the most credible and up-to-date o To address discrepancies between arriving and departing aircraft numbers • New Section, 4 Engagement Activities, included to highlight the impact of general feedback on the design concepts • Relevant stakeholder feedback and impacts added to each design element section • Eastern Element Concept 4 Conclusion updated to align with Annex D • South Eastern Element Concept 2 Conclusion updated to align with Annex D • South Eastern Element Concept 3 Conclusion updated to align with Annex D

Contents

References

1	CAA Airspace Modernisation Strategy (CAP 1711)
2	Airspace Change Process (CAP 1616)
3	All published documentation related to this airspace change proposal is available on the CAA Airspace Change Portal: *Link*

1. Introduction – about this document, scope, background

1.1 This Airspace Change Proposal (ACP) is sponsored by NERL. Today's Air Traffic Services (ATS) route network has evolved over time and does not fully exploit modern navigation technology. The objective of this ACP is to modernise the route network surrounding the Scottish Terminal Manoeuvring Area (ScTMA) in accordance with the Civil Aviation Authority's (CAA's) Airspace Modernisation Strategy (AMS) using Performance Based Navigation (PBN). This will provide capacity benefits through systemisation by reducing conflicts whilst also providing a reduction in fuel burn and CO_2 emissions.

1.2 This document forms part of the document set required for the CAP1616 airspace change process:

Stage 2 Develop and Assess, Step 2A Design Options and Design Principle Evaluation.

1.3 Its purpose is to provide, and describe, a comprehensive list of options, and to provide stakeholders with a high-level evaluation of those options. We sought feedback on the options and used it to perform the analysis against the agreed design principles. This forms the basis for selection of the most appropriate options for further development, and rejection of the remainder.

1.4 We re-engaged our representative stakeholder groups, identified during the Stage 1 Design Principle development, to involve them in the development of these options (see Annex A: Summary of Stakeholder Engagement on page 112 for details).

1.5 We thank the stakeholders for their involvement and feedback during this engagement.

Where are we in the Airspace Change Process?

1.6 We have completed Stage 1: Define, where we recognised the need for an airspace change and the design principles underpinning it. We are now in Stage 2: Develop and Assess, and this document is part of Step 2A.

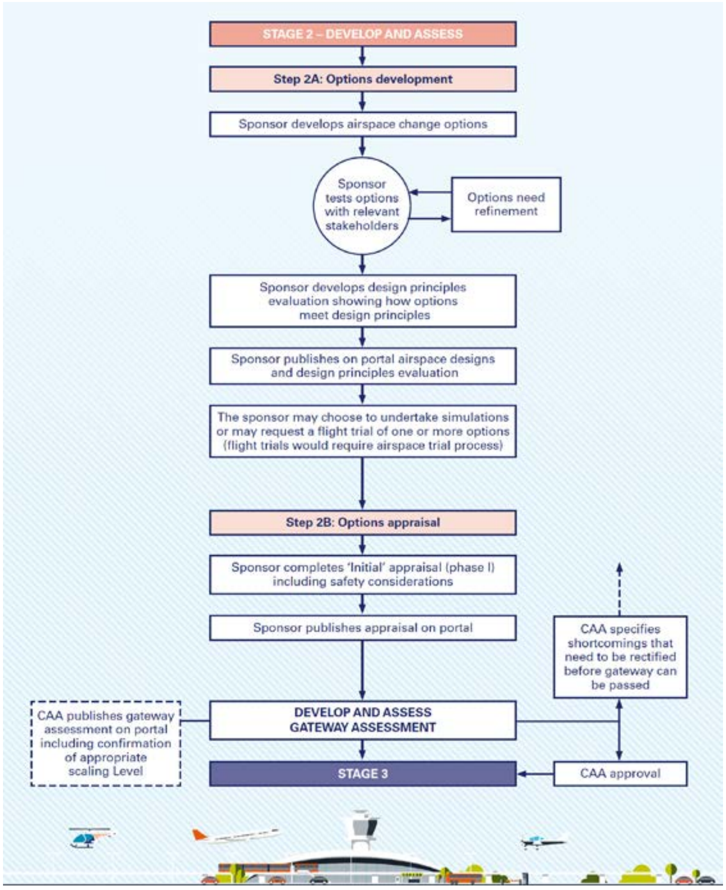

Figure 1: CAP1616 (Ed. 4: Page 45) Airspace Change Process Stage 2

Scope

1.7 This ACP seeks to make changes to the en-route network serving the ScTMA, in particular Edinburgh and Glasgow airports as well as the network in the surrounding airspace. Figure 2 shows the lateral perimeter of the ScTMA (orange shape) and the lateral limits of this change (red shape). This change is constrained laterally by existing airspace structures. Vertically, the changes will extend from a lowest Level, FL75 (~7500 ft, below this level the changes will be made by an airport), up to where the ATS routes will interface with Free Route Airspace (FRA), FL255 (~25,500 ft) to the east and remainder of the extant upper ATS route network. This ACP seeks to modernise the en-route network through systemisation of traffic arriving and departing the ScTMA where this would provide an operational benefit.

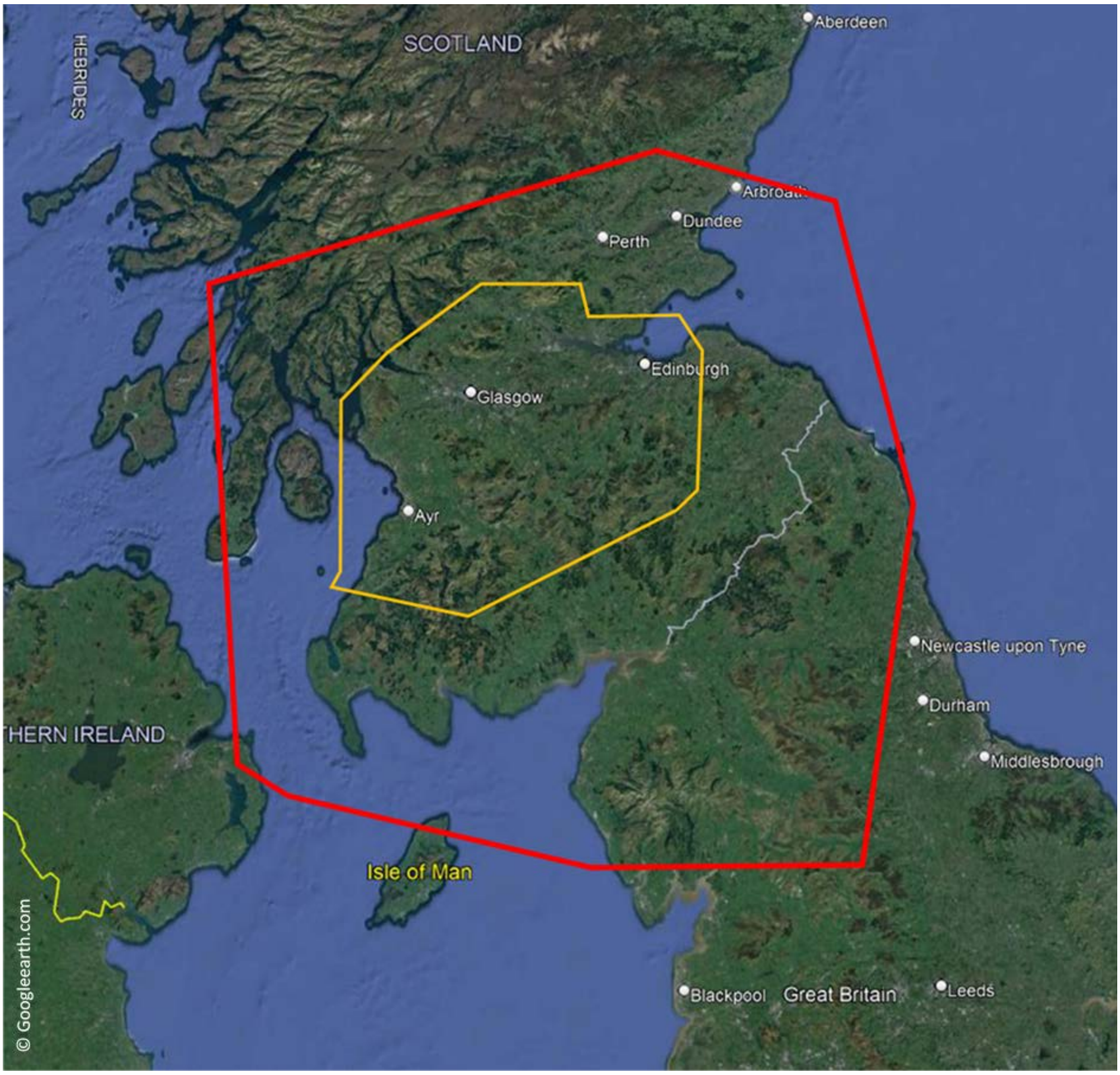

Figure 2: Lateral extent of the ScTMA ACP changes (Red Shape) and the extant ScTMA (Orange Shape).

1.8 The changes described within this documentation are in accordance with the UK Airspace Modernisation Strategy (AMS) (ref 1) which was initiated by the CAA and the UK Government (this superseded the CAA Future Airspace Strategy (FAS)). The AMS aims to make large-scale improvements within UK airspace. This ACP is part of the NERL-led programme referred to as the *Future Airspace Strategy Implementation – North (FASI-N)*. This program of projects seeks to modernise the en-route airspace managed by Scottish Area Control (ScAC) and includes redesigns of the ScTMA and Manchester TMAs (MTMA).

1.9 The route network affected by this change may extend into the airspace managed by London Area Control (LAC) and hence there may be changes between the interface between NERL ScAC and NERL LAC.

1.10 The lateral limits of this ACP do not extend to the boundaries of the UK FIR/UIR and therefore there are no interdependencies with neighbouring ANSPs.

Why must this change happen now?

1.11 The en-route network has evolved over many years and has been defined by the use of ground-based navigation beacons. Improvements in navigation technology (e.g. satellite-based navigation) have removed these constraints and hence it is possible to undertake a complete redesign of the route network within the fixed constraints. This aims to give benefits in safety, environment and capacity. Undertaking such a fundamental redesign of the airspace is considered a once in a generation opportunity and will secure efficiencies and benefits for many years to come.

Combining ACPs

1.12 Two en-route ACPs were originally submitted by NERL to make changes to the en-route route network serving the ScTMA. These were split to address the route network serving:

- Edinburgh Airport
- Glasgow Airport

1.13 As the design options for each ACP were being developed, NERL identified that the design options being discussed for the two ACPs were fully intwined and dependent upon each other. This meant that each ACP would only tell half the story and it would be simpler to present and understand if these changes were combined into a single submission incorporating all the ScTMA en-route network changes. NERL initiated combining these ACPs towards the end of 2021. This involved:

- Confirming the Statements of Need for both ACPs aligned
- Confirming the Design Principles for both ACPs aligned
- Confirming ACOG, the CAA, Edinburgh and Glasgow airports agreed with the proposal to amalgamate the 2 ScTMA en-route ACPs
- Confirming our stakeholders had no objections to the proposed amalgamation of these ACPs

1.14 NERL formally combined the en-route ACPs on 25th March 2022. Owing to the similarities between the Edinburgh and Glasgow en-route ACPs it was agreed between NERL and, the CAA that this work would continue using the original Edinburgh en-route ACP portal page and Statement of Need, (ACP-2019-74), however, the portal page would be renamed **Future Airspace Strategy Implementation – ScTMA**.

What was the Statement of Need for this proposal?

1.15 The Statement of Need (SoN) is the first step a Sponsor must take, to initiate an airspace change proposal with the CAA. Following the assessment meeting, a revised SoN was submitted to the CAA. The design concepts in this document strive to address the SoN. Ours is summarised below. The full document is published on the CAA's Airspace Change Portal.

This airspace change will propose to make changes to the Scottish TMA airspace and ATS route network including STARs. The proposed changes will interface with SIDs and arrival transitions serving Edinburgh airport. Edinburgh airport is currently in the process of proposing changes to their SIDs/Arrival transitions under a separate ACP. The changes proposed to the Scottish TMA by this ACP will be coordinated with, and will complement, the airport's proposals. *Current Situation* Conventional procedures serving Edinburgh airport are not PBN and will soon be made obsolete by the planned decommissioning of several conventional navigation beacons. *Issue to be addressed* Consideration of traffic flows between Glasgow and Edinburgh. Introduction of improved holding arrangements and ATS routes will reduce conflicts by systemising the traffic, also reducing fuel burn & CO2 emissions for flights using these routes. New routes and STARs may be required to provide network connectivity for new SIDs/ Arrival transitions as proposed by Edinburgh airport. This proposal forms part of the plan for delivering the Airspace Modernisation Strategy. *Cause* Legacy ATS structure requires modernisation in accordance with the Airspace Modernisation Strategy.

1.16 Note this Statement of Need was written pre-COVID-19 pandemic. Whilst the situation has changed, this airspace change is designed to address long-term growth and capitalise on available modern navigation capabilities to facilitate efficiencies and environmental benefits. NERL believes that, despite the current downturn in air traffic, the changes proposed remain fully justified and beneficial for the long-term benefit of the UK economy and the aviation industry.

1.17 There are no other similar airspace change examples for us to assess, due to the AMS driving the SoN.

Design Principles

1.18 The design principles and priorities were set following engagement with representative stakeholder groups and feedback received as part of CAP1616 Stage 1. The design principles and their relative priorities are shown below. Stakeholder feedback as well as input from SMEs was incorporated into the design principle evaluation. This will be used to determine which options will be discarded and which will be progressed. This analysis is contained in Annex D: Design Principle Evaluation.

No	Design Principle	Category	Notes
1	The airspace will maintain or enhance current levels of Safety **(High)**	Safety	
2	The proposed airspace will maintain or enhance operational resilience of the ATC network **(High)**	Operational	
3	The proposed airspace design will yield the greatest capacity benefits from systemisation **(High)**	Operational	
4	The ScTMA airspace design will provide a compatible and optimised interface between the lower-level terminal airspace; the upper	Technical	

	Free Route Airspace (FRA) and the ATS network **(High)**		
5	The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route **(Medium)**	Economic	This includes track mileage/ fuel-burn/ route charges
6	The proposed ScTMA airspace will facilitate the reduction of CO_2 emissions along the entire route **(Medium)**	Environmental	
7	Minimise environmental impacts to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower-level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsored ACP) **(Low)**	Environmental	
8	The ScTMA airspace should be compatible with the requirements of the MoD **(Medium)**	Operational	
9	The impacts on GA and other civilian airspace users due to ScTMA should be minimised **(Medium)**	Operational	This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures
10	The classification and volume[1] of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of UK airspace users **(Medium)**	Technical	This may include releasing CAS as appropriate
11	The route network linking Airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. **(High)**	Technical	Where appropriate, the use of RNP should be considered if the fleet mix can support it.
12	Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. **(High)**	Policy	The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including:

[1] When assessing volume of CAS, a major increase will be defined as an entirely new airspace structure and minor will be defined as an increase to an existing structure to accommodate an option.

			- the need to increase aviation capacity. - growth to be sustainable. - the need to maximise the utilisation of existing runway capacity.
13	The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft **(Medium)**	Environmental	Feedback from Airlines

Table 1 Design Principles

1.19 The design principle development document is published on the CAA airspace change portal here.

1.20 As the options presented in this document will be high level concepts (see para 2.14) rather than defined solutions within defined volumes of airspace, the airspace classification (part of DP10) will be considered in the design principle evaluation but not included in the options at this stage. NERL will seek to use the most appropriate airspace classification and minimum volume of CAS possible to deliver the finalised design. This level of detail will be provided at stage 3.

Altimetry – altitudes, heights and flight levels

1.21 Aircraft can use different vertical references when flying. "Altitude" specifically means the distance of an aircraft above mean sea level using a local or regional pressure setting, "height" specifically means the distance above the surface/terrain using a localised pressure setting, and "Flight Level" (FL) is a standard reference for aircraft at higher levels, in hundreds of feet, so an aircraft at FL90 is 90 x 100 = 9,000ft above the standard reference.

1.22 Controllers need to use reference settings which are common for the aircraft under their control and those adjacent, hence the use of altitudes and flight levels.

1.23 All of the changes proposed within this ACP are above an altitude of 7,000ft which is above the transition altitude[2] (TA). Above the TA aircraft fly with reference to Flight Levels, hence in this document we generally refer to flight levels (FLs).

1.24 The Airspace Modernisation Strategy (AMS) Alignment

1.25 The Department for Transport (DfT) and CAA's co-sponsored Airspace Modernisation Strategy (AMS, CAP1711) is detailed in Ref. 1.

1.26 The CAA have consulted on Issue 2 of the AMS but this has not been published at time of writing. NERL will ensure that the holistic solution(s) presented at Stage 3 will accord with the latest iteration of the AMS.

1.27 It was originally intended that a Masterplan[3] would be developed which would facilitate coordination of the FASI ACPs and assist where there may be dependencies or conflicting requirements between ACPs. Iteration 1 of the Masterplan, approved and published by the CAA in February 2021, covered the FASI-South (FASI-S) Airports. In May 2021 the DfT/CAA informed NERL of the requirement to update the masterplan to

[2] The altitude at which aircraft change to using FL as the altimetry reference for maintaining vertical separation (i.e. change from the local airport pressure setting to standard pressure: 1013 hPa). This is 6000ft for Edinburgh and the majority of UK airports.

[3] The Masterplan is a high-level coordinated implementation plan of a series of individual airspace design changes that need to be developed in coordination to achieve the range of benefits that modernisation can deliver.

cover both the FASI-S and FASI-N Airports. This was submitted by the Airspace Change Organising Group (ACOG) to the DfT/CAA at the end of 2021 and was accepted by the CAA/DfT January 2022.

1.28 This will be a qualitative evaluation by experienced SMEs to consider the degree of alignment with the AMS, based on balancing capacity provision, noise impacts and flight efficiency.

1.29 The ScTMA documents fully align with the guidance set out in the Masterplan and the objectives in the AMS. A matrix detailing how the ScTMA ACP aligns with each objective of the AMS is given in Annex E: Airspace Modernisation Strategy Alignment. (Note this matrix relates to the alignment of the ScTMA ACP with the AMS, not the alignment of individual option elements).

Potential Interactions and Dependencies with other FASI-N ACPs

1.30 The FASI-N program includes the involvement of NERL and numerous airports which make up the ScTMA cluster which are sponsoring separate ACPs. Within the ScTMA, Edinburgh (EGPH) and Glasgow (EGPF) airports are undertaking ACPs (ACP-2019-32 and ACP-2019-46 respectively) to amend their arrival and departure routes. The changes being proposed in this ACP will predominantly interface with these arrival and departure routes.

1.31 Glasgow Prestwick (EGPK) airport is also contained within the ScTMA, however, they updated their SIDs in 2019 and are not currently undertaking an ACP to amend their low-level arrival or departure routes. Glasgow Prestwick has been engaged with as a stakeholder and informed this ACP will interface with their existing procedures.

1.32 Aberdeen Airport are sponsoring their own FASI-N ACP and may benefit from the changes described within the NERL ScTMA ACP. However, this ACP is not dependent on the Aberdeen changes.

1.33 Cumbernauld (EGPG) and Strathaven (GB-0180) are both situated under the ScTMA and have been included as stakeholders. These airports do not have, nor are they implementing any permanent published procedures connecting them to the ATS route network which this ACP will be required to connect to.

1.34 Aircraft transiting to/or from other airports, which currently route through the ScTMA, such as Aberdeen (EGPD, a FASI-N airport) or Dundee (EGPN), will benefit from the proposed network improvements and have been included as stakeholders for this ACP.

1.35 The airports contained within the ScTMA have been engaged with throughout the CAP1616 process thus far (see Annex A: Summary of Stakeholder Engagement). Both Glasgow and Edinburgh airports are sponsoring their own ACPs to propose changes to their arrival and departure procedures below 7,000 ft. NERL is in regular engagement with these airports to ensure that the designs proposed are compatible with the airports known aspirations or extant procedures to ensure connectivity is maintained or can be provided by the addition of new link routes.

1.36 There is potential for conflicts across these interdependent ACPs which may lead to compromises and or trade-offs. These will be considered further at Stage 3 of the CAP1616 process.

1.37 The changes contained within this ACP could abut the changes being made to the NERL led MTMA ACPs (ACP-2019-76 and ACP-2019-77). The changes proposed in the ScTMA ACP consider the MTMA proposed changes and will ensure that they remain compatible.

Potential Interactions and Dependencies with other ACPs

1.38 Following an airspace trial, the MoD have initiated an ACP (ACP-2020-026) to introduce a new Danger Area (DA) which overlaps with the lateral limits of this change (Figure 3: Adapted internal Airspace map showing the location of MoD airspace trials for a new DA in the vicinity of the ScTMA change.).

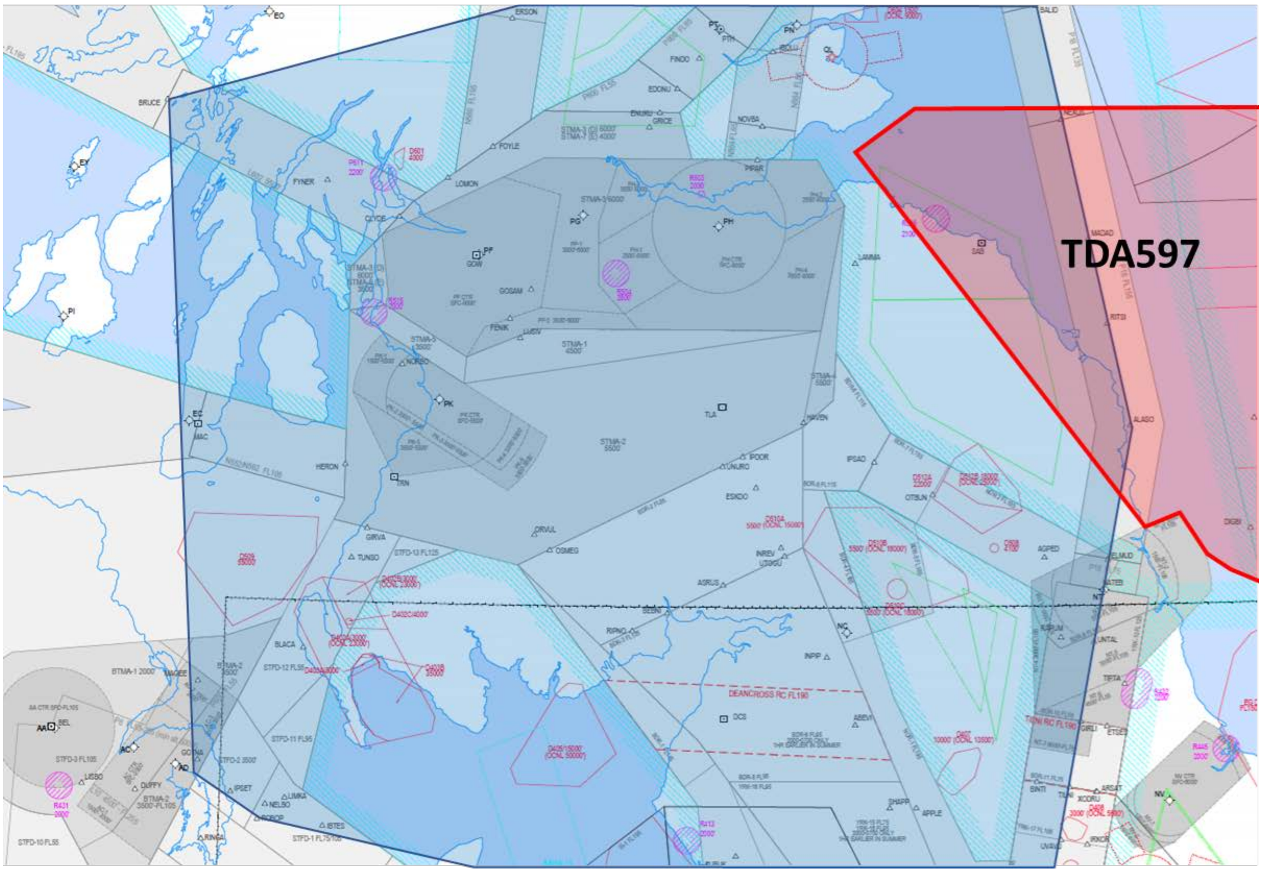

Figure 3: Adapted internal Airspace map showing the location of MoD airspace trials for a new DA in the vicinity of the ScTMA change.

1.39 It is anticipated that this DA will broadly reflect the trial area shown and is anticipated to be activated for defined hours within two periods of 2 weeks per year. This may change to ensure that MoD requirements are met in the future. This ACP will consider this information as well as any further engagement from the MoD in its design as the development of a DA will have a direct impact on this ACP.

ACP Categorisation Level

1.40 Under CAP 1616 the CAA categorises ACPs by assigning them a "Level", which in-turn influences the process that is required to be followed. The Levels are primarily based on the altitude and area in which the changes occur and are defined in CAP1616 (Ed. 4) Table 2 (page 26).

1.41 Prior to the COVID-19 pandemic this ACP was being progressed in parallel with ACPs sponsored by Edinburgh and Glasgow airports. The impact of COVID-19 on air traffic levels resulted in the airports and NERL suspending progress on their ACPs. Following the upturn in traffic and the availability of DfT funding to continue the FASI-N changes, the airports and NERL are now in a position to continue with the CAP1616 process to improve the ScTMA airspace.

1.42 During the assessment meeting NERL explained the changes which will be included and progressed under this ACP are only to the en-route airspace, above 7,000 ft. However, NERL are aware that these changes could have an impact on aircraft tracks below 7,000 ft and understands that by the definitions in CAP1616 this change is expected to be categorised as a Level 1 ACP.

1.43 As the changes included within this ACP are to the en-route airspace, above 7,000 ft[4], and as agreed, Edinburgh and Glasgow airports are pursuing their own ACPs to change the low level (below 7,000 ft) NERL would consider it disproportionate to consider noise impacts within this ACP and therefore proposes the process is scaled as follows.

NERL intends to:

1.44 Continue to work closely with airport stakeholders on options development and, as changes are being progressed by an airport, provide support to their consultations (where requested and appropriate).

1.45 Continue to engage with airport stakeholders to determine suitable hold locations and SID connectivity points

1.46 Consult with relevant identified stakeholders on the proposals for change to the enroute network above 7,000 ft.

1.47 Produce en-route network CO_2 emissions analysis (During Stage 3).

NERL does not intend to:

1.48 Consult on routes below 7,000 ft. If no changes below 7,000 ft are proposed by airports, the ScTMA design will interface with the extant routes.

1.49 Proactively consult local communities.

1.50 Produce noise analyses (unless related to ATS route changes below 7,000 ft agl not within the scope of one of the FASI-N associated airport ACPs).

[4] See DfT Air Navigation Guidance 2017

2. Design Options Summary

2.1 The Statement of Need for this proposal identifies the following areas contained within the en-route (above 7,000 ft) environment which this proposal seeks to address:

- Introduction of improved holding arrangements and airport connectivity.
- Introduction of systemised ATS routes.

2.2 Appropriate connectivity between the holding structures and ATS routes will also be provided as will connectivity from the SID end points to the ATS route network as required.

2.3 The options proposed to modernise the ScTMA airspace have been developed using a user centred design process. This process uses first-hand knowledge provided through Subject Matter Experts (SMEs), in this case NERL Air Traffic Control Officers (ATCOs) and airspace design experts, to develop options which are theoretically feasible within the constraints and demand of the airspace.

2.4 Furthermore, the options have been developed in coordination with our key stakeholders, Edinburgh and Glasgow airports, to ensure the options proposed are compatible with the airports' own ACP designs.

2.5 The options have been shared with all stakeholders contacted during Stage 1 so that they could inform the design.

2.6 Whilst the long list of options is substantial, it does not attempt to list every possible solution which could be proposed if starting with no constraints. The options proposed have considered route utilisation to only consider options which are thought to offer benefits to the operation.

2.7 This Subject Matter Expert input has identified that:

- A systemised ATS route structure is not a suitable option for all routes arriving/ departing the ScTMA. i.e., The routes to the North of the ScTMA are not sufficiently utilised to warrant the introduction of a systemised airspace structure. In these cases, a systemised route structure was not considered a likely solution but has been included in the design principle evaluation.
- An opportunity exists to introduce a new arrival and/or departure route to the East serving Northern Europe.

2.8 The lateral limits of this ScTMA change sits within the Scottish FIR and contains several existing airspace structures which restrict the options that can be considered. The main airspace considerations are shown in Figure 4.

2.9 Any changes which are proposed have considered these fixed airspace constraints. Where an option has been proposed which may require additional CAS or encroaches upon the fixed airspace structures depicted in Figure 4, the relevant stakeholder organisation has been engaged to determine if there is a feasible solution to provision the change. Only feasible options will be considered and included within this documentation.

2.10 Within the lateral limits of the ScTMA change there are areas designated as National Scenic Areas (NSA's, Scotland) and of Outstanding Natural Beauty (AONB, England). CAP1616 states that *where practicable, it is desirable that airspace routes below 7,000 ft should seek to avoid flying over AONB and national parks*. This change is not intending to alter airspace below 7,000ft and therefore AONB do not need to be considered. Should it transpire that an option will impact on an AONB/NSA the relevant stakeholders will be informed and engaged with.

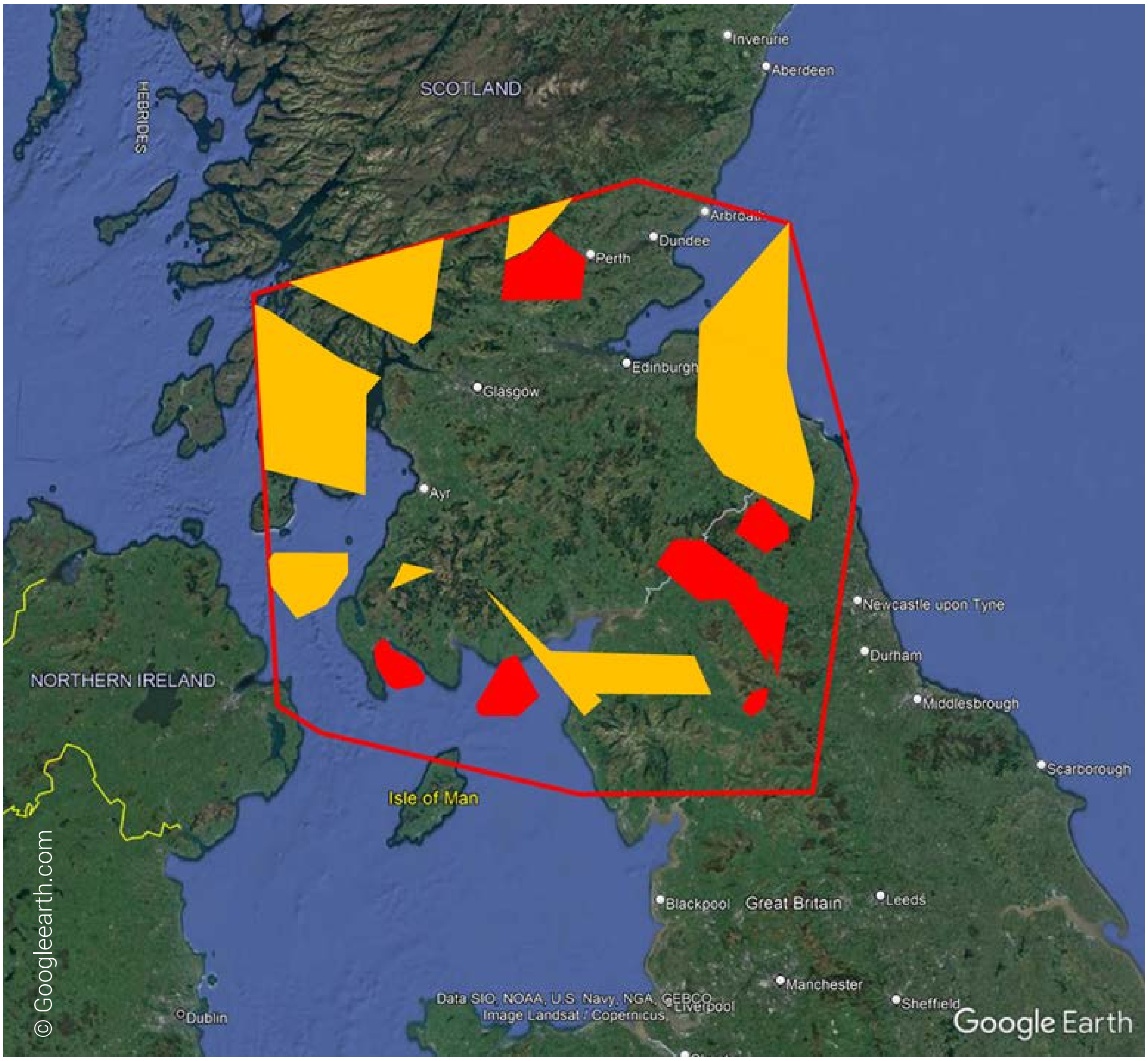

Figure 4: Existing airspace structures which constrain the options development. Structures in Red are likely to be exceptionally challenging and harder to change i.e. Military Danger areas. Structures in orange are likely to be to be more less challenging to change i.e. Temporary reserved areas between FL195 and FL245.

2.11 The existing airway structure and density of flights (Figure 5) shows that traffic arriving and departing the ScTMA do so predominantly to the south.

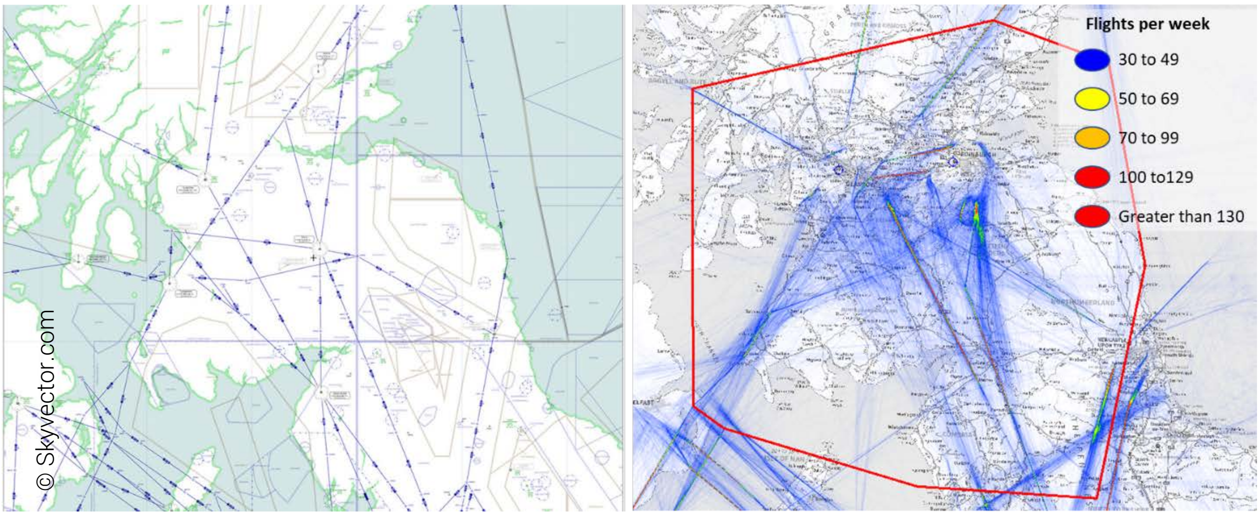

Figure 5: Left Figure-Lower ATS route Structure (FL70-250) within the ScTMA ACP area. Right Figure- the density of flights (, ATC Playback, FL70-250, Aug 5-11 2019)

2.12 In this document we intend to divide the options into those addressing the:

- ATS route network
- ScTMA airport connectivity (above 7,000 ft), including holds[5], arrival routes and departure connectivity.

2.13 Due to the various existing airspace constraints, the route demand and the geographical scope of the airspace, the ATS route network options will be subdivided into 6 geographical elements (Figure 6) with a list of design options presented for each element. The depicted areas are indicative of where the majority of the changes could be implemented and are not definitive airspace boundaries. The options considered will consider existing constraints (Figure 4), current flows (Figure 12) and en-route connectivity. As such, these options will be limited to modernising the existing ATS routes unless SME input indicates there is an opportunity to provide benefit by the addition of new connectivity. The proposed options may extend outside of these areas to provide connectivity between the option and the surrounding airspace.

2.14 Owing to the number of possible route positions within each element, it is not proportional to list all the possible permutations for each element. Therefore, these options will be presented as high-level concepts at this stage before being developed into holistic design options at Stage 3.

2.15 The ScTMA airport connectivity options will be subdivided into options:

- Providing connectivity to airport SID end points.
- Providing connectivity to airport arrival structures.
- Airport arrival structures, i.e., holds.

2.16 As a result of the number of long list options within each individual element it is not proportional to list all the possible permutations leading to a holistic design. Therefore, for this stage of the ACP process the individual elements will remain segregated and will be described as concepts.

2.17 NERL has undertaken visualisation simulations to check the overall operability of the combined element changes using indicative tracks which align with the design options.

[5] When not specified the word “hold” refers to any delay absorption mechanism

2.18 These simulations have been used for stakeholder engagement to demonstrate how the design options could operate together although it has been stated that they do not necessarily represent the final location of tracks.

2.19 At Stage 2, the options will be qualitatively appraised and evaluated as the options are presented as high-level concepts. Without, defined routes, working in unison with the neighbouring elements, a holistic design, it is not possible to quantify the benefits for each option.

2.20 In some instances, within existing CAS, it may be more appropriate to provide connectivity via a flight plannable DCT as opposed to an ATS route. In these instances, a new flight plannable DCT will be incorporated in appendix 4 of the Route Availability Document (RAD). RAD changes are outside the scope of the CAP1616 process and will be included as information only. However, if NERL considers increased use of DCTs it may be more appropriate that this will be included as a specific question in the Stage 3 consultation.

2.21 During the later Stage 3 work, the progressed design concepts from each element will be evaluated for compatibility against the other element options and combined and developed into defined options which will be consulted upon in Stage 3.

2.22 Following this evaluation, NERL reserves the right to revive a design option eliminated at Stage 2 if the progressed option is found to be incompatible with the options progressed for the other elements. This is consistent with the FASI Masterplan.

2.23 During Stage 3, compatible element concepts will be developed into a holistic design solution or solutions which will be consulted on and quantitatively apprised.

2.24 The following tables, Table 2 to Table 10 summarise the design concepts considered for each element.

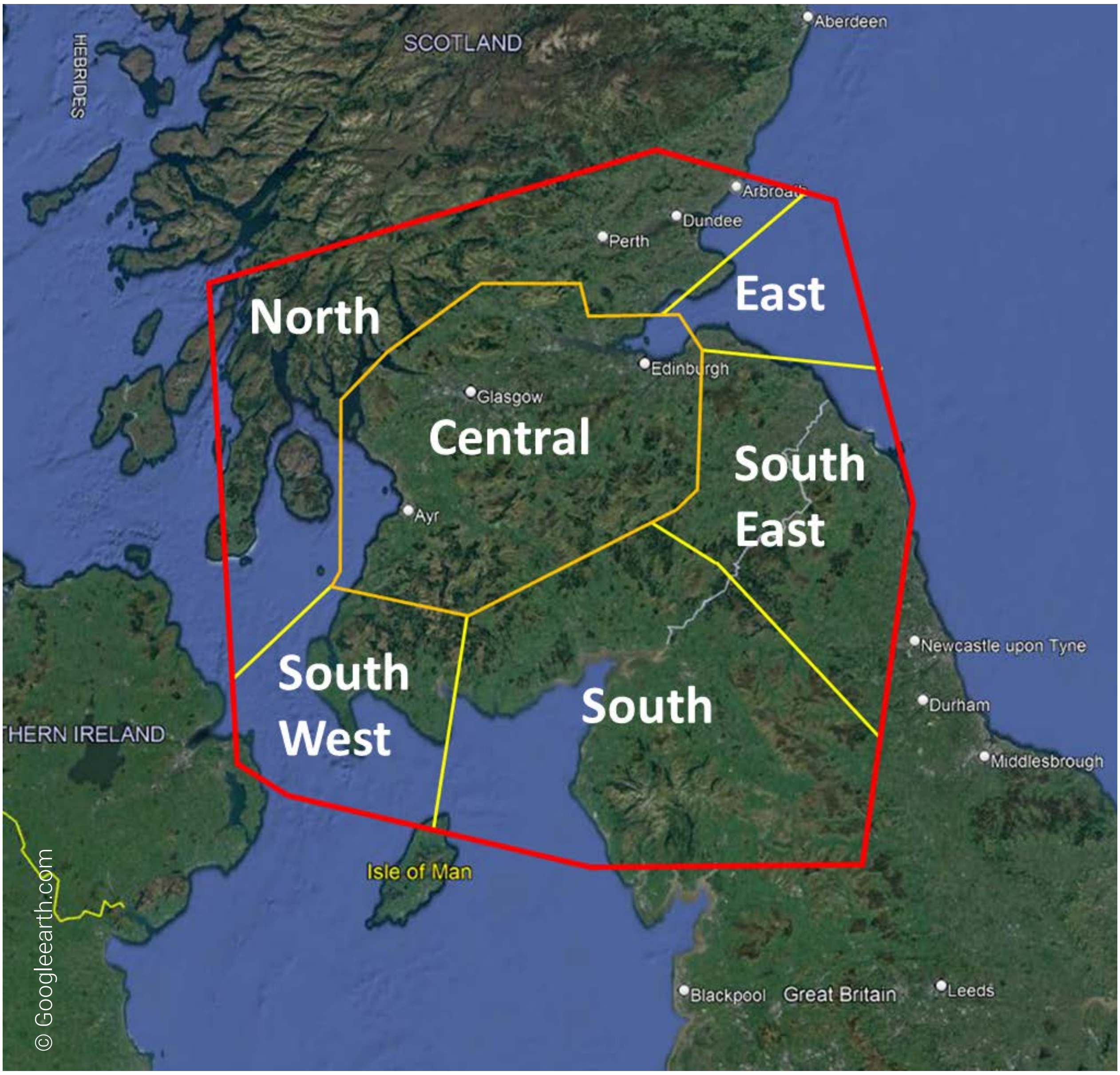

Figure 6: Geographic Lateral limits of each option element area.

Eastern Element		
Option Concept	Comprehensive List of Options	Description
0	Baseline	The "Do-Nothing" option. Keep everything as it is currently
1	East bound route only avoiding gliding area	Introduction of an East bound unidirectional ATS route connecting the ScTMA to FRA. This option will remain clear of the Northumbria gliding area.
2	West bound route only avoiding gliding area	Introduction of a West bound unidirectional ATS route connecting FRA to the ScTMA. This option will remain clear of the Northumbria gliding area.
3	Bidirectional route avoiding gliding area	Introduction of a bidirectional ATS route providing connectivity between FRA and the ScTMA. This option will remain clear of the Northumbria gliding area.
4	Systemised routes avoiding gliding area	Introduction of a systemised ATS route structure providing connectivity between FRA and the ScTMA. This option will remain clear of the Northumbria gliding area.
5	East bound route only impacting gliding area	Introduction of an East bound unidirectional ATS route connecting FRA to the ScTMA. This option will provide optimum flight profiles by impacting the Northumbria gliding area.
6	West bound route only impacting gliding area	Introduction of a West bound unidirectional ATS route connecting the ScTMA to FRA. This option will provide optimum flight profiles by impacting the Northumbria gliding area.
7	Bidirectional route impacting gliding area	Introduction of a bidirectional ATS route providing connectivity between FRA and the ScTMA. This option will provide optimum flight profiles by impacting the Northumbria gliding area.
8	Systemised routes impacting gliding area	Introduction of a systemised ATS route structure providing connectivity between FRA and the ScTMA. This option will provide optimum flight profiles by impacting the Northumbria gliding area.

Table 2: Summary of ATS Route Option Concepts for Eastern Element

South-Eastern Element		
Option Concept	Comprehensive List of Options	Description
0	Baseline	The "Do-Nothing" option. Keep everything as it is currently
1	Bidirectional route with lowered CAS bases	No change to the lateral tracks of the existing ATS route. However, the base of the existing CAS will be lowered to facilitate optimised arrival and departure profiles to/from the ScTMA Airfields.
2	Systemised routes	Introduction of a systemised ATS route structure providing assured separation between arrivals and departures.
3	Systemised routes with lowered CAS bases	Introduction of a systemised ATS route structure providing assured separation between arrivals and departures. This option includes the lowering of controlled airspace to facilitate optimised arrival and departure profiles to/from the ScTMA Airfields.

Table 3: Summary of ATS Route Option Concepts for South-Eastern Element

Southern Element		
Option Concept	Comprehensive List of Options	Description
0	Baseline	The "Do-Nothing" option. Keep everything as it is currently
1	Bidirectional routes	Introduction of new and review of existing ATS route structure to provide improved connectivity between the ScTMA central element and the southern ATS route network. This option will not change the bases of existing CAS.
2	Bidirectional routes including a review of CAS bases	Introduction of new and review of existing ATS route structure to provide improved connectivity between the ScTMA central element and the southern ATS route network. The bases of CAS will be reviewed and amended to facilitate optimised arrival and departure profiles to/from the ScTMA Airfields.
3	Systemised routes orientated according to traffic flow	Introduction of a systemised route structure connecting the ScTMA central element to the Southern ATS route network. Traffic flows will be orientated with Northbound routes on one side of the airspace and South bound rotes on the other. This option will not change the bases of existing CAS.
4	Systemised routes orientated according to traffic flow including a review of CAS bases	Introduction of a systemised route structure connecting the ScTMA central element to the Southern ATS route network. Traffic flows will be orientated with Northbound routes on one side of the airspace and South bound rotes on the other. The bases of CAS will be reviewed and amended to facilitate optimised arrival and departure profiles to/from the ScTMA Airfields.
5	Systemised routes orientated by ScTMA airports	Introduction of a systemised route structure connecting the ScTMA central element to the Southern ATS route network. Traffic flows will be orientated with routes serving Glasgow/ Prestwick airports on one side of the airspace and routes serving Edinburgh on the other. This option will not change the bases of existing CAS.
6	Systemised routes orientated by ScTMA airports including a review of CAS bases	Introduction of a systemised route structure connecting the ScTMA central element to the Southern ATS route network. Traffic flows will be orientated with routes serving Glasgow/ Prestwick airports on one side of the airspace and routes serving Edinburgh on the other. The bases of CAS will be reviewed and amended to facilitate optimised arrival and departure profiles to/from the ScTMA Airfields.

Table 4: Summary of ATS Route Option Concepts for Southern Element

South-western Element		
Option Concept	Comprehensive List of Options	Description
0	Baseline	The "Do-Nothing" option. Keep everything as it is currently
1	Systemised Routes	Extension of the existing P600/P620 systemised route structure from GOTNA/ NELBO to the ScTMA central element.

Table 5: Summary of ATS Route Option Concepts for South-Western Element

Northern Element		
Option Concept	Comprehensive List of Options	Description
0	Baseline	The “Do-Nothing” option. Keep everything as it is currently
1	Bi-directional route structure and review bases	Maintain the existing route structure but review the base of CAS. CAS base will be amended as necessary to facilitate optimised arrival and departure profiles to/from the ScTMA Airfields.
2	Systemised route structure	Introduce a systemised route structure.
3	Systemised route structure and review bases	Introduce a systemised route structure and review the base of CAS. CAS base will be amended as necessary to facilitate optimised arrival and departure profiles to/from the ScTMA Airfields.

Table 6: Summary of ATS Route Option Concepts for Northern Element

Central Element		
Option Concept	Comprehensive List of Options	Description
0	Baseline	The “Do-Nothing” option. Keep everything as it is currently
1	Provide ATS route connectivity to/between surrounding elements	Introduction of ATS routes connecting ATS routes arriving and departing the ScTMA.

Table 7: Summary of ATS Route Option Concepts for Central Element

Departure Connectivity		
Option Concept	Comprehensive List of Options	Description
0	Baseline	The “Do-Nothing” option. Keep everything as it is currently
1	Provide departure connectivity from airport SID end points to adjacent elements via ATS routes within existing CAS	Provision of link routes connecting airport SID end points with the ATS network.
2	Provide departure connectivity from airport SID end points to adjacent elements via ATS routes requiring additional CAS	Provision of link routes connecting airport SID end points with the ATS network requiring additional CAS.

Table 8: Summary of Airfield departure connectivity to ATS route options

Arrival Connectivity		
Option Concept	Comprehensive List of Options	Description
0	Baseline	The “Do-Nothing” option. Keep everything as it is currently
1	Provide arrival connectivity from ATS route network to airport arrival structure via STARs within existing CAS	Provision of link routes connecting ATS network with airport arrival structure. Link routes will be contained within existing CAS
2	Provide arrival connectivity from ATS route network to airport arrival structure via STARs requiring new CAS	Provision of link routes connecting ATS network with airport arrival structure. Link routes will require additional CAS

Table 9: Summary of en-route to airport arrival structure connectivity options

Arrival Structure Concepts		
Option Concept	Comprehensive List of Options	Description
0	Baseline	The “Do-Nothing” option. Keep everything as it is currently
1	Review existing holds and introduce new radial holds where required.	Existing holds will be reviewed and kept, amended or removed. Additional radial holding structures will be proposed where required.
2	Review existing holds and introduce new lateral delay absorption structures (i.e., point merge, trombone etc.)	Existing holds will be reviewed and kept, amended or removed. Additional lateral delay absorption structures will be proposed where required.

Table 10: Summary of airport arrival structure options

Current Airspace

2.25 The ScTMA is currently served by eight traffic flows contained within CTAs (Figure 7) which will be reviewed and modernised as required as part of this ACP. These routes are predicated on historic DVOR radials.

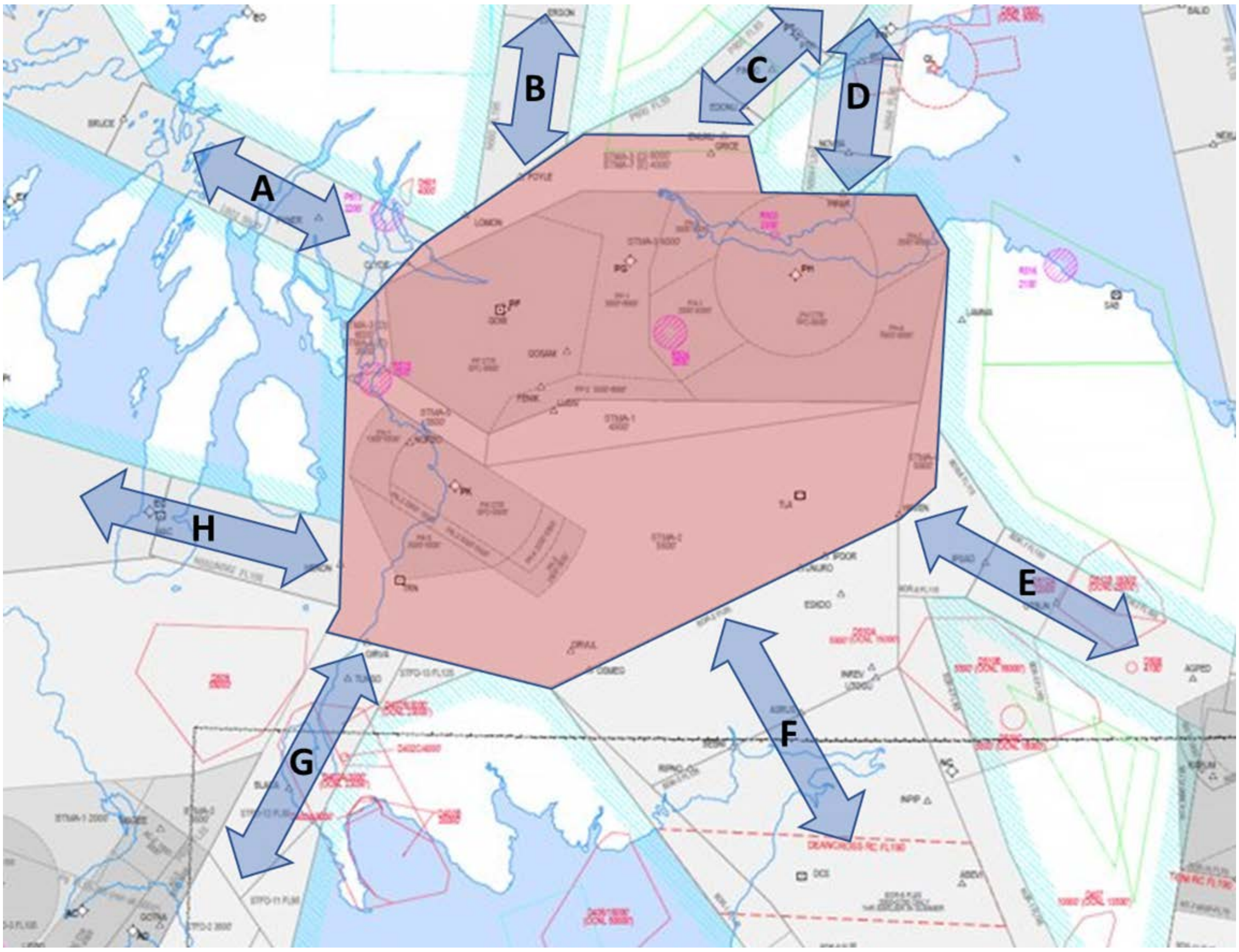

Figure 7: Adapted internal Airspace map showing the routes which converge on the ScTMA. The ScTMA is shown as a red shape, ATS routes within CTAs as illustrative blue arrows

2.26 Each CTA provides connectivity between the ScTMA airports and other airports as detailed in Table 11 as well as routes for overflight traffic.

Traffic Flow	CTA	ATS Routes	Description of Traffic
A	Argyll CTA1	L602	This route is mainly used by traffic to and from the Outer Hebrides. This traffic is mainly lower level (<FL195) and most leave CAS to be worked by West coast sector. Occasional this route is used for traffic to join the transatlantic oceanic tracks.
B	Moray CTAs 10-13	N560	This route is mainly used by Glasgow Traffic (via LOMON) to Wick, Sumburgh, Inverness, the Orkneys and occasionally Reykjavik. This traffic is mainly lower level (<FL195). On occasion this route is used by aircraft joining the northerly transatlantic oceanic tracks (>58N).
C	TAY CTAs 1,2 and 6	P600	This route is used by Edinburgh and Glasgow traffic to Perth, Aberdeen, the Shetlands and Northern Scandinavia.
D	TAY CTAs 3,4, and 5	N864	This route is used by Edinburgh and Glasgow traffic to Perth, Aberdeen, the Shetlands and Northern Scandinavia. However, this routes use is dependent on gliding area activity.
E	Borders CTA 6 and 7	Y96	This is the main route connecting the ScTMA to Northern Europe and the East.
F	Borders CTA 1,2,3, 4, 6 and 8 Yorkshire CTA 4,7, 15 and 16 Northern CTA 1	T256, L612, N864, N601	This is the main domestic route as well as the route connecting the ScTMA to central Europe
G	Strangford CTA 12 and 13	P600	This is the main route connecting the ScTMA to Belfast TMA Ireland, the Iberian Peninsula, the Canaries and Africa.
H	Argyll CTA 3	N562	This route provides connectivity to the transatlantic oceanic tracks.

Table 11: Description of traffic flows between the ScTMA and the UK ATS route network.

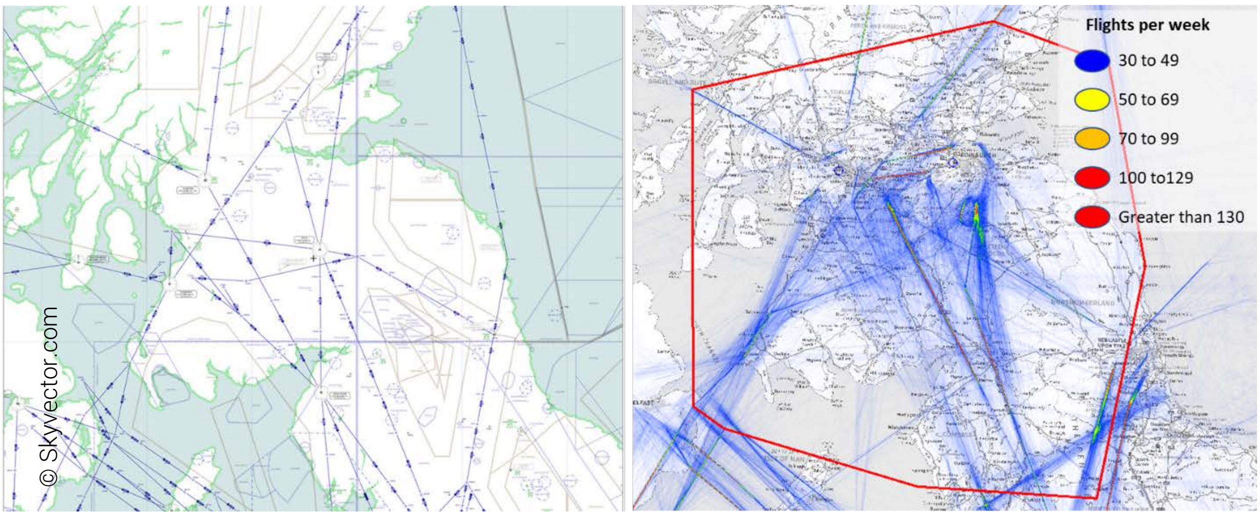

Figure 8: Left Figure- Lower ATS route Structure (FL70-250) within the ScTMA ACP area and, Right Figure- the density of flights (ATC Playback, (FL70-250, Aug 5-11 2019)

2.27 Figure 8 demonstrates that the traffic arriving/ departing the ScTMA does so predominantly to the south (CTA's E, F and G, c.80% ScTMA traffic).

2.28 Routes H, A, B, C and D are grouped together as the Northern Element. Due to the low level of traffic that currently utilise and forecast to use these CTA's, it is envisaged that sufficient benefit to justify the introduction of a systemised airspace structure for any of these routes will not be present.

2.29 Arrivals into the ScTMA Airfields follow published STARs to transition from the ATS route network to the published holds listed in Table 12 and shown in Figure 9

Airfield	Hold	STAR	Associated ATS Routes
Edinburgh (EGPH)	STIRA TARTN	PTH 1G INPIP 1E, AGPED 1E, GIRVA 1E, TUNSO 1E,	P600 (U)N601, P600, Y96, N110
Glasgow (EGPF)	STIRA LANAK FOYLE FYNER	PTH 1G AGPED 1G, APPLE 1G, RIBEL 1G, BLACA 1G ERSON 1G BRUCE 1G	P600 Y96, N110, UN590, (U)N601, P600 N560 L602, Y958, FRA
Prestwick (EGPK)	SUMIN TRN	None[6] (Used tactically by ATC) BLACA 1G, APPLE 2P, RIBEL 2P	P600, Y96, (U)N601, UN590 P600, UN590, (U)N601, N562[7]

Table 12: List of ScTMA holds and the arrival routes which supply them.

[6] The SUMIN Hold is issued tactically by Scottish ACC

[7] N562 arrivals are routed direct to TRN by Scottish ACC

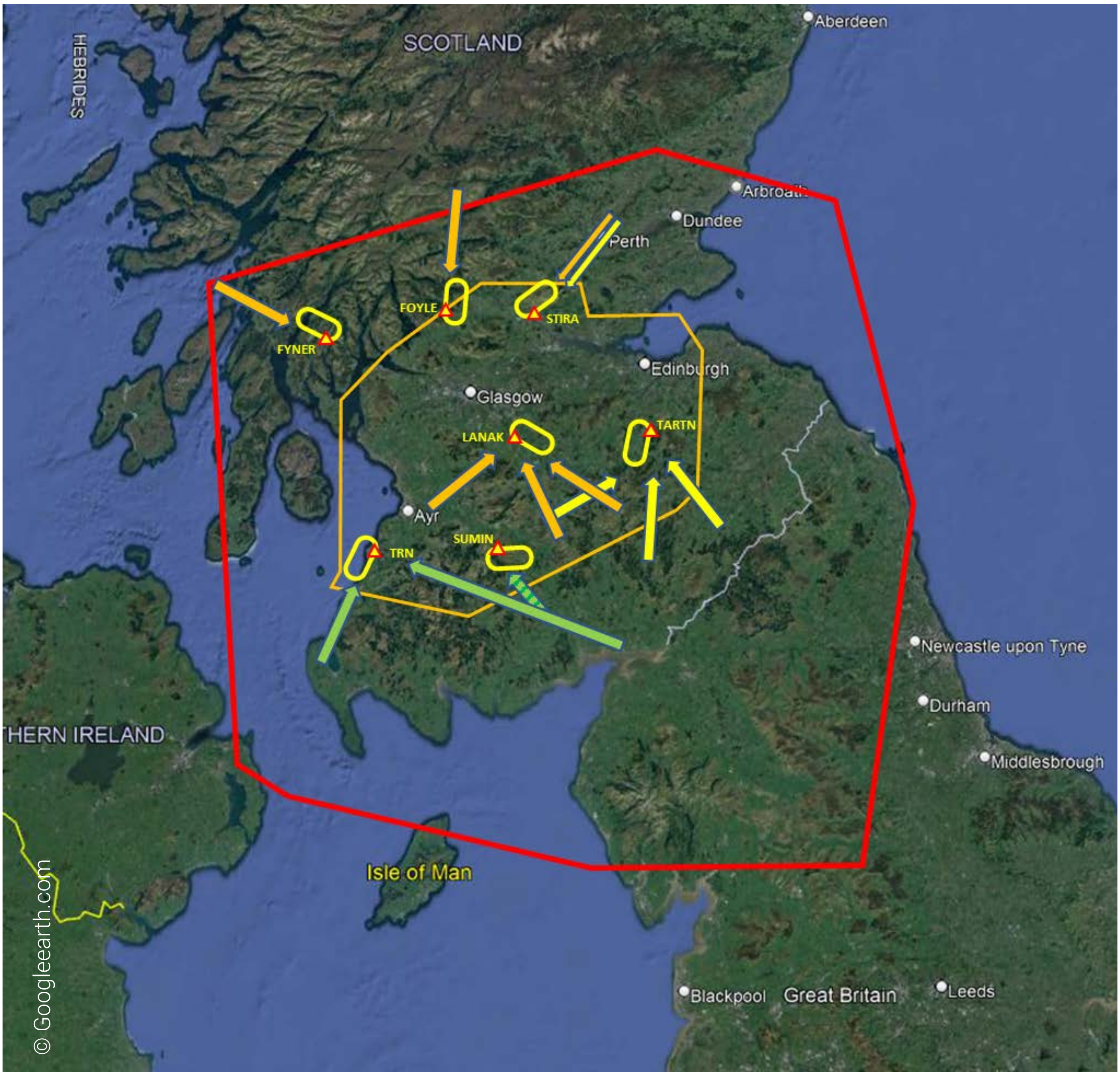

Figure 9: Geographic location of extant ScTMA Holds and arrival traffic flows. (Yellow arrows is EGPH traffic, Orange arrows are EGPF traffic and green arrows EGPK traffic)

2.30 Departures from the three main ScTMA Airfields follow published SIDs to transition from airport to join the ATS route network listed in Table 13 and shown in Figure 9

Airfield	SID	Associated ATS Routes
Edinburgh (EGPH)	GOSAM (1C/1D) TALLA (6C/6D) GRICE (3C/4D)	P600, UL612 P600, Y96, N57, L612, N864 P600
Glasgow (EGPF)	NORBO (1H/1J) LUSIV (1A/1B) TALLA (5A/6B) TRN (6B/3A) FOYLE (3A/3B) LOMON (3A/3B) ROBBO (2A/2B) CLYDE (3A/3B) PTH (4A/4B)	T256, L186, Y96 L612 Y96 P600, N562 N560 OAC FIR L602, Y958, OAC P600
Prestwick (EGPK)	LUCCO 1K SUDBY 1L SUMIN 1L TRN 2K TRN 2L DAUNT 1K OKNOB 1L	Z248, Z250 Z249 Z250 P600, N562 P600, N562 Z246 Z,247

Table 13: List of ScTMA SIDs and the connected ATS routes.

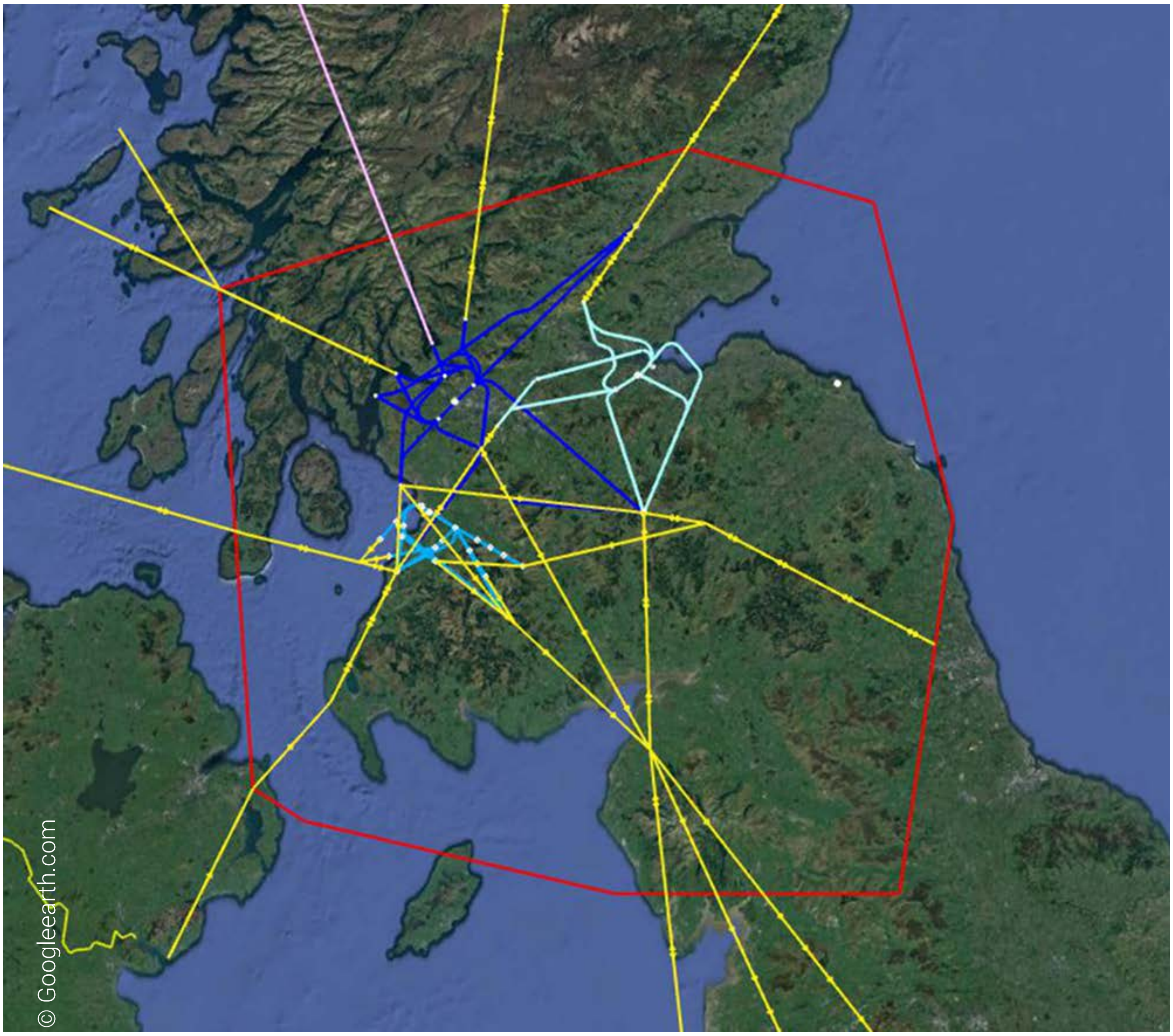

Figure 10: Existing ScTMA airport SIDs (light blue- Edinburgh, mid-blue- Prestwick and dark blue- Glasgow) and their route connectivity (Yellow-ATS routes, Pink- DCT route).

Illustration of Number of Flights

2.31 In 2019 (pre-pandemic) 331,367 flights transited the airspace impacted by this change.

2.32 These flights are broken down into Glasgow, Edinburgh, Prestwick and Cumbernauld arrivals and departures and are shown in Table 14. The 2019 movement data is based on Central Flow Management Unit (CFMU) figures which is flight planned data. These CFMU figures were interrogated to determine how many aircraft submitted a relevant SID (departure) or STAR (arrival) for the in-scope airfields. The initial values submitted in V1.0 of this documentation exhibited a discrepancy between arrival and departure data with departures always being greater than arrivals. This is likely explained by aircraft submitting a flight plan without the inclusion of a published STAR.[8]

2.33 The revised data below shows the 2019 CFMU arrival and departure figures per airport, not filtered by SIDs and STARs. It should be noted that the data the FASI-N airports may use within their submissions is likely to differ to the values below as they are likely to have a more accurate data, i.e. actual movement data and/or a different growth model.

2.34 The 2019 data is the most credible and up-to-date data available as any data from later years would have been skewed due the impact of the Covid-19 pandemic on the aviation industry.

Edinburgh Airport		Glasgow Airport		Prestwick Airport		Cumbernauld		Overflights	Total
Arrivals	Departures	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures		
65818	65819	42207	42277	4384	4325	45	44	106,148	331,067

Table 14: Breakdown of 2019 traffic which is impacted by this change

2.35 Figure 11 shows the airlines and the proportions of flights which accounted for more than 1% of the total traffic in 2019. This data includes airlines which have since ceased (Coloured Red) trading[9] as it is anticipated that these routes will be filled by other operators.

[8] There is a possibility of aircraft not filing a SID or STAR, e.g. a VFR flight. However, the figures presented are for illustratively purposes only and are considered sufficiently accurate for this stage of the submission.

[9] Flybe (BEE) recommenced trading in April 2022. However, they are no longer flying all the routes they previously flew.

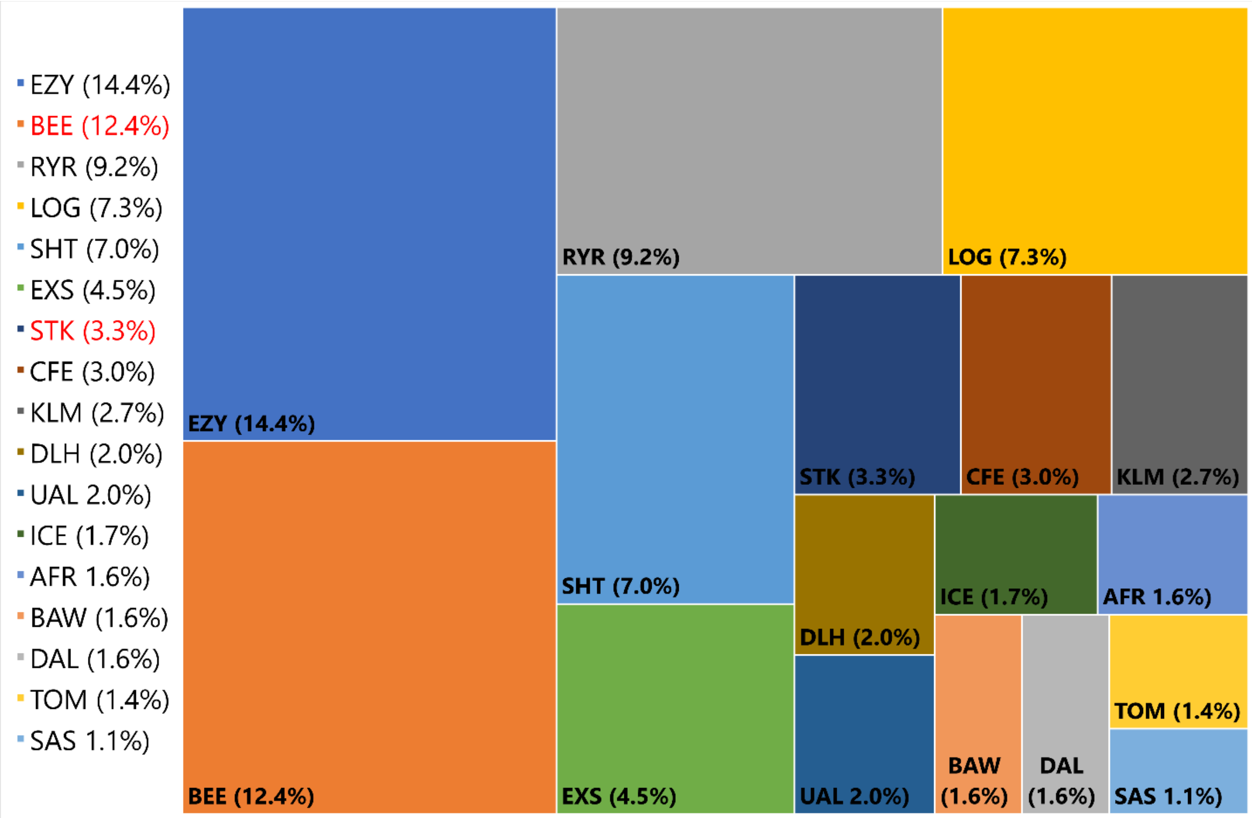

Figure 11: List of operators which accounted for >1% of flights and the proportion of these flights flown in the impacted airspace in 2019.

2.36 NERL analytics have used the 2019 traffic data to forecast the total traffic for 2025, the planned year of implementation to 2027 using the STATFOR October 2021 Base case forecast. 2028- 2035 (10 years post implementation) have been grown using a long-term average UK growth rate of 1.6% taken from the STATFOR May 2021 Base case extended forecast. The growth values are shown in Table 15.

Year	Edinburgh Airport		Glasgow Airport		Prestwick Airport		Cumbernauld		Overflights	Total
	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures		
2025	64171	63554	40745	40941	4421	4291	44	44	96,027	314238
2026	64592	63679	40731	40822	4477	4295	44	44	105,802	324486
2027	64681	63760	40728	40937	4493	4284	44	44	107,740	326711
2028	65716	64780	41380	41592	4565	4353	45	45	109,464	331940
2029	66767	65817	42042	42257	4638	4422	45	45	111,215	337248
2030	67836	66870	42714	42934	4712	4493	46	46	112,994	342645
2031	68921	67940	43398	43621	4788	4565	47	47	114,802	348129
2032	70024	69027	44092	44318	4864	4638	48	48	116,639	353698
2033	71144	70131	44798	45028	4942	4712	48	48	118,505	359356
2034	72282	71253	45514	45748	5021	4787	49	49	120,401	365104
2035	73439	72393	46243	46480	5101	4864	50	50	122,327	370947

Table 15: Forecast growth of traffic impacted by this change; 2025 (implementation year) to 2035 (10 years post implementation

Introduction and Release of Controlled Airspace

2.37 Some options may require a change to the volume or classification of controlled airspace (CAS). Where possible CAS that is no longer required will be released. This could serve to off-set, in part, any new CAS that may be required.

2.38 The lowest level of new CAS proposed by any option herein, is FL75. However, where the base of CAS could be raised, it is possible that a base below 7000 ft (e.g. 5500 ft or FL65) could be raised to say FL75, thereby releasing CAS (converting it to uncontrolled Class G airspace). NERL considers this to be analogous to the SARG policy; Reduction In Notified Hours Or Disestablishment Of Airspace Restrictions, which is a Level 0 ACP process. The release of CAS will only be considered where there is existing Class G airspace available for GA traffic to currently use below CAS. Therefore, any release of CAS will result in an increase in airspace volume of existing Class G airspace. NERL considers that the release of airspace, under this condition, will have a negligible impact on the number of aircraft using the airspace. Therefore, the release of CAS will only deliver positive impact to our stakeholders by providing a greater volume of airspace for GA traffic to fly within. This could also lead to a potential reduction in the noise impact for stakeholders on the ground as aircraft will be able to elect to fly at a higher altitude. NERL therefore considers the release of CAS will not compromise the arguments for scalability within this ACP as this would only deliver positive benefits. NERL does not consider it proportional to attempt an analysis of potential GA use or impact of this use of released CAS as it is not possible to predict the GA utilisation of this airspace.

Interface with Airport Procedures within the ScTMA

2.39 Edinburgh and Glasgow Airports are progressing ACPs to amend their arrival and departure procedures. NERL, Edinburgh Airport and Glasgow Airport are progressing their ACPs in close collaboration with each other so that individual requirements can be considered and incorporated into the others design. The airports will be responsible for all changes below 7,000 ft agl unless it is to an ATS route outside the scope of an airport ACP. NERL will provide connectivity to the airports proposed procedures but any resultant impact below 7,000 ft agl will remain the responsibility of the airport to consult upon.

2.40 In order to provide connectivity to other airports within or in close proximity to the ScTMA, NERL will ensure connectivity to existing procedures are maintained. These airports are included as stakeholders and are aware of the changes proposed. It may be necessary to change/ truncate some existing SIDs and STARs however, any changes made within this ACP will be contained in airspace above 7,000 ft.

Interface with Free Route Airspace

2.41 Free route airspace is a specified airspace within which users may freely plan a route between a defined entry point and a defined exit point, with the possibility to route via intermediate (published or unpublished) way points, without reference to the ATS route network, subject to airspace availability. Within this airspace, flights remain subject to air traffic control.

2.42 In December 2021 NERL introduced the first deployment of FRA (FRA D1) into the UK FIR. This airspace structure extends from FL255 up to FL660 (Figure 12).

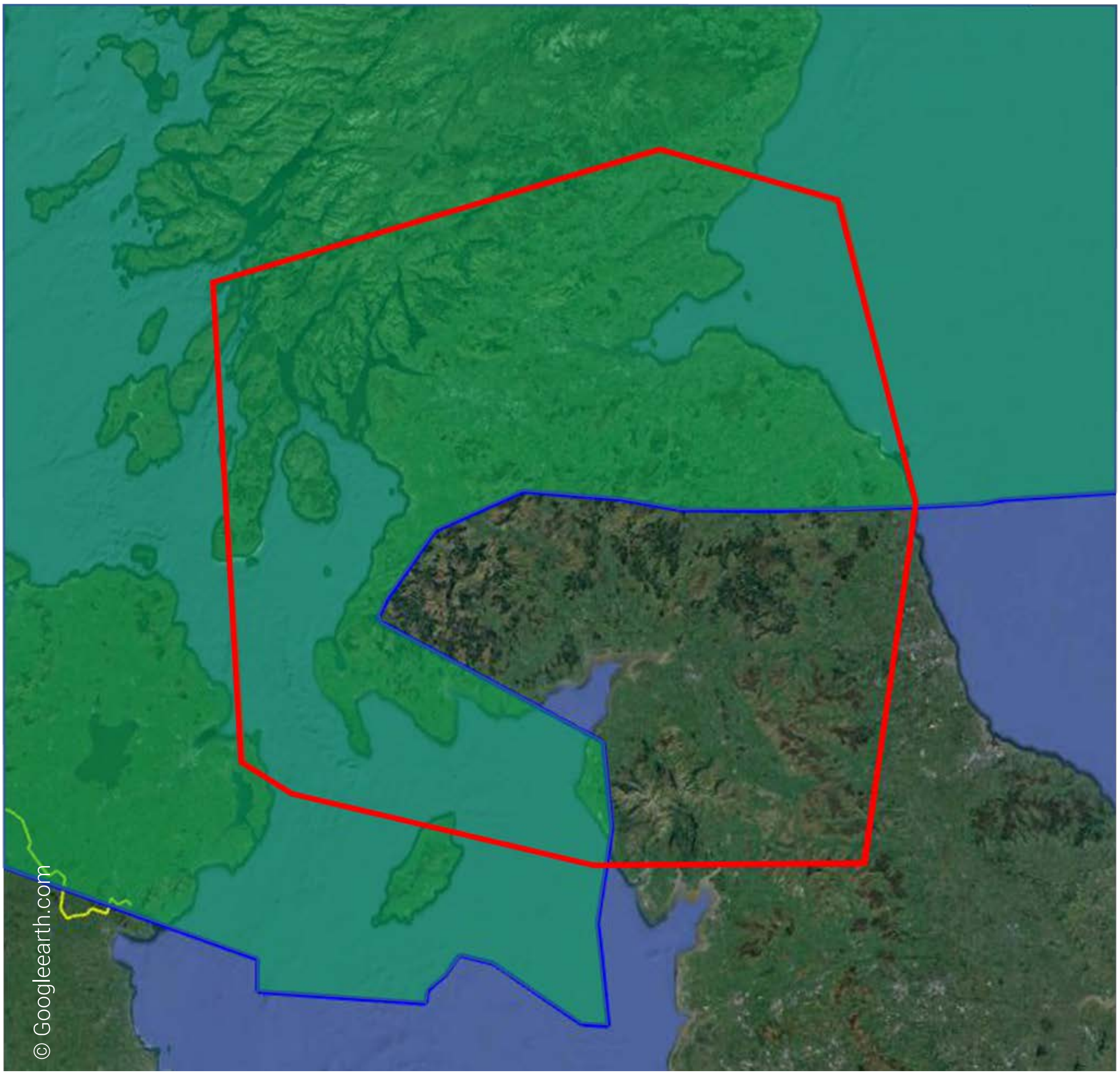

Figure 12: Location of existing UK FRA airspace (green polygon) and the lateral limits of this ACP (red polygon)

2.43 FRA Deployment 3 is planned to complete the introduction of FRA within the confines of the lateral limits of this change following the ScTMA deployment discussed herein.

2.44 Aircraft arriving and departing FRA do so via published FRA entry and exit points which are defined within the UK AIP.

2.45 Any revision to the ATS routes serving the ScTMA may result in the requirement to amend/ introduce new FRA exit and or entry points. These points will be amended/ introduced as required.

What do we mean by systemisation?

2.46 Systemisation refers to the process of reducing the need for human intervention in the air traffic control system. This can be achieved by utilising improved navigation capabilities to develop a network of routes that are safely separated from one another so that aircraft are guaranteed to be kept apart reducing the need for air traffic control to intervene so often. Systemisation can reduce complexity whilst benefiting safety and capacity. A systemised route network is characterised by the following:

- An air route network where climbing and descending aircraft follow a structured route system based on their departure point and/ or destination.
- Route design is predicted on the use of Performance based Navigation (PBN) which enables very accurate track conformance to routes. This allows the distance between routes to be safely minimised based on CAP1385 requirements.
- Systemising ATS routes should reduce the amount of tactical intervention required, by optimising the routings available within a given piece of airspace.
- The allocation of traffic on routes is driven by traffic data, both historical and future, and the input from sector controllers.
- Although systemisation reduces the amount of controller intervention required, there will still be instances where controllers will need to use tactical intervention (e.g. radar headings or shortcuts between waypoints) for expedition and to resolve conflictions.
- It is recognised that the introduction of systemised airspace may introduce additional planned track mileage for some routes.

3. Baseline

3.1 The holistic baseline is described within the current airspace section above. A baseline description will be provided for each element area detailing the existing use of airspace covered by that element but will not consider the other elements.

4. Engagement Activities

4.1 In-line with CAP1616 requirements NATS has undertaken an extensive engagement program during the development of the following options/concepts.

4.2 However, as the options have been developed in collaboration with the lower level FASI-N airport sponsors, and the options have been presented as high level concepts, there was limited scope for stakeholder feedback to impact the concepts as presented in this submission. However, there was the following general feedback, see Table 16:

Stakeholder	Feedback	Impact
MoD	MoD requires continued access to SUAs	Flexible use of Airspace will be considered throughout the design process
Airline Operators	General support for Systemisation	Systemised airspace concepts have been developed
BGA/MOD/LAA	New CAS should be kept to a minimum	Additional CAS volume will be minimised in line with DP10.
EGPF/EGPH	Designs should accommodate aircraft with different RNAV specification or performance	Aircraft RNAV specification and performance will be considered throughout the design process.

Table 16: General feedback and impact on considered designs

5. ATS Route Concepts

5.1 The following concepts describe the longlist of options to modernise the UK ATS route network within and surrounding the ScTMA. The airspace has been split into geographical elements as described in the Design Options Summary above and depicted in Figure 6:

Eastern Element

The Eastern element seeks to introduce new flows which provide more direct connectivity options for aircraft arriving and/or departing the ScTMA from FRA airspace to the east. We consider this a radical design concept due to the significant change in flows compared to the baseline.

Concept 0: Baseline

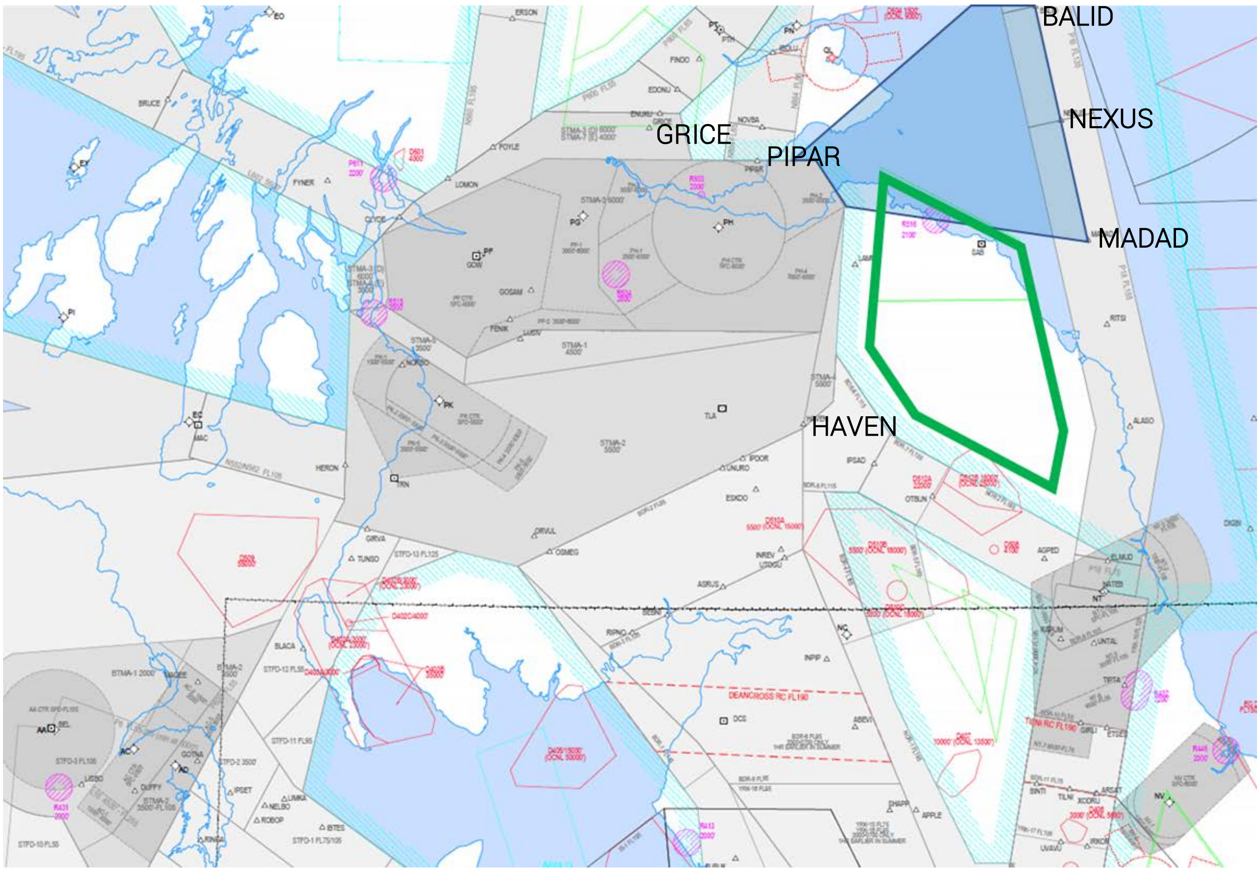

Figure 13: Adapted internal Airspace map showing the lateral limits of the Eastern Element and surrounding airspace.

5.2 A 'Do-Nothing' option representing the current day operation must be included and is used as the baseline against which all other options are compared.

5.3 The Eastern element of this ACP currently is not used by aircraft arriving and departing the ScTMA. Aircraft from and to Northern Europe currently arrive/ leave the Scottish TMA to the north via P600 (GRICE)/ N864 (PIPAR) or to the south via Y96 (HAVEN).

5.4 In this element area the following airspace classifications occur:

- SFC-FL195 Class G
- FL195-600 Class C (above FL255 is FRA).

- Where this element overlaps with the P18[10] (CDR) CTAs the base of CAS is:
    - Between BALID and NEXUS- FL135
    - Between NEXUS and MADAD- FL155

5.5 The southern edge of this element area overlaps with the Northern edge of the Northumbria Gliding area (FL195-240, outlined in green in Figure 13) and is considered an amendable design constraint.

5.6 To the East the MoD are looking to introduce a new Danger area (DA). The consideration of MoD activity because of this DA will be acknowledged through continued MoD engagement.

5.7 The 'Do-Nothing' option is **Rejected** since it would bring no benefit and did not meet the progression requirements set for the Design Principle Evaluation (See Annex D: Design Principle Evaluation).

Stakeholder feedback relevant to design element

Stakeholder	Feedback	Impact
EGPH/ EGPF	Support the development of arrival and departure options within this element	Eastern element developed
EGPH/ EGPF	Support the development of arrival and departure options within this element for EGPK operations	This will be considered during Stage 3
MoD	MoD would like to highlight their ACP relating to TDA597 and their continued access	The MoD ACP will be assessed for any interdependencies with this FASI-N ScTMA submission
BGA/ LAA/ Millfield Gliding	Eastern element could impact GA access to gliding areas	GA community will be engaged throughout the ACP process and improved access to other areas considered
BGA/ LAA/ Millfield Gliding	Redefining the northern boundary of the Northumbrian Gliding areas would not unduly influence gliding operations.	Eastern element development will continue
EGPH/ BGA/ LAA	Combining the northern and southern Elements of the Northumberland Gliding area was viewed as a positive change	This will be considered in the development of the Eastern element concepts

Table 17: Stakeholder feedback received pertinent to the Eastern element

[10] There is an NERL Sponsored ACP, (ACP-2021-020) to address the availability of the CDR portion of P18.

Concept 1: East bound route only avoiding gliding area

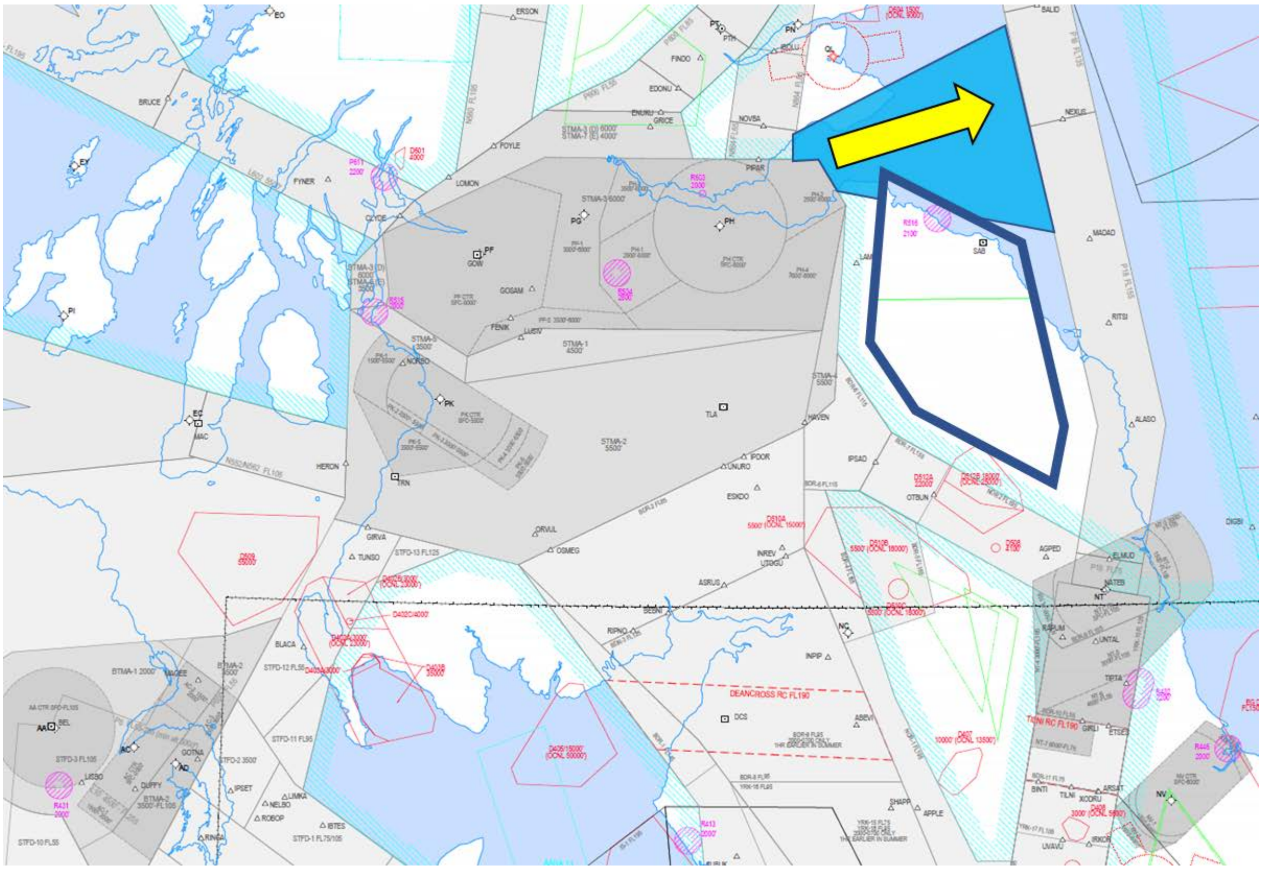

Figure 14: Adapted internal Airspace map showing the Eastern element Concept 1- East bound only route which avoids the gliding area

5.8 The approach used for Concept 1 is to introduce an east bound only route which connects the ScTMA airspace with FRA.

5.9 This Concept will provide more direct departure options for the ScTMA airfields for aircraft leaving the ScTMA towards FRA whilst avoiding the Northumbria Gliding area.

5.10 Connectivity to P18 could be provided enabling an alternate departure route from the ScTMA.

5.11 Concept 1 will provide capacity benefits by redistributing aircraft destined for northern Europe from P600, N864 and Y96 to this more direct route and subsequently reducing conflictions within the ScTMA reducing controller workload.

5.12 A departure only route in this area will offer substantial fuel savings and is likely to reduce population overflight for aircraft departing the ScTMA airfields electing to use this route due to reduced track miles over land.

Benefits

- Reduction in CO_2 and fuel for departures
- Could facilitate the reduction of CAS elsewhere in the ScTMA
- Reduction in controller workload
- Enables a likely reduction in population overflown

Issues

- No arrival options
- CO_2 and fuel benefit not maximised by avoiding gliding area
- Additional CAS required (potentially mitigated by the release of other CAS elsewhere).

Conclusion

5.13 This Concept had promising aspects: however, it may require a large area of additional CAS. This Concept does not offer an arrival option nor does the concept allow for the most direct routes as the gliding area has to be avoided. These two factors limit the available benefit which would be used to offset the additional CAS required. As such this Concept is not as good as one that offers both arrival and departure options and impacts the gliding area.

5.14 Design Principle Evaluation concluded that:

- 8 design principles were “Met”
- 3 design principles were “Partially Met” (2 High, 1 Med)
- 2 design principles were “Not Met” (1 High, 1 Med).

5.15 Please see Annex D: Design Principle Evaluation for detailed analysis.

5.16 This Concept was **Rejected** for further consideration as it did not meet the progression requirements set for the Design Principle Evaluation.

Concept 2: West bound route only avoiding gliding area

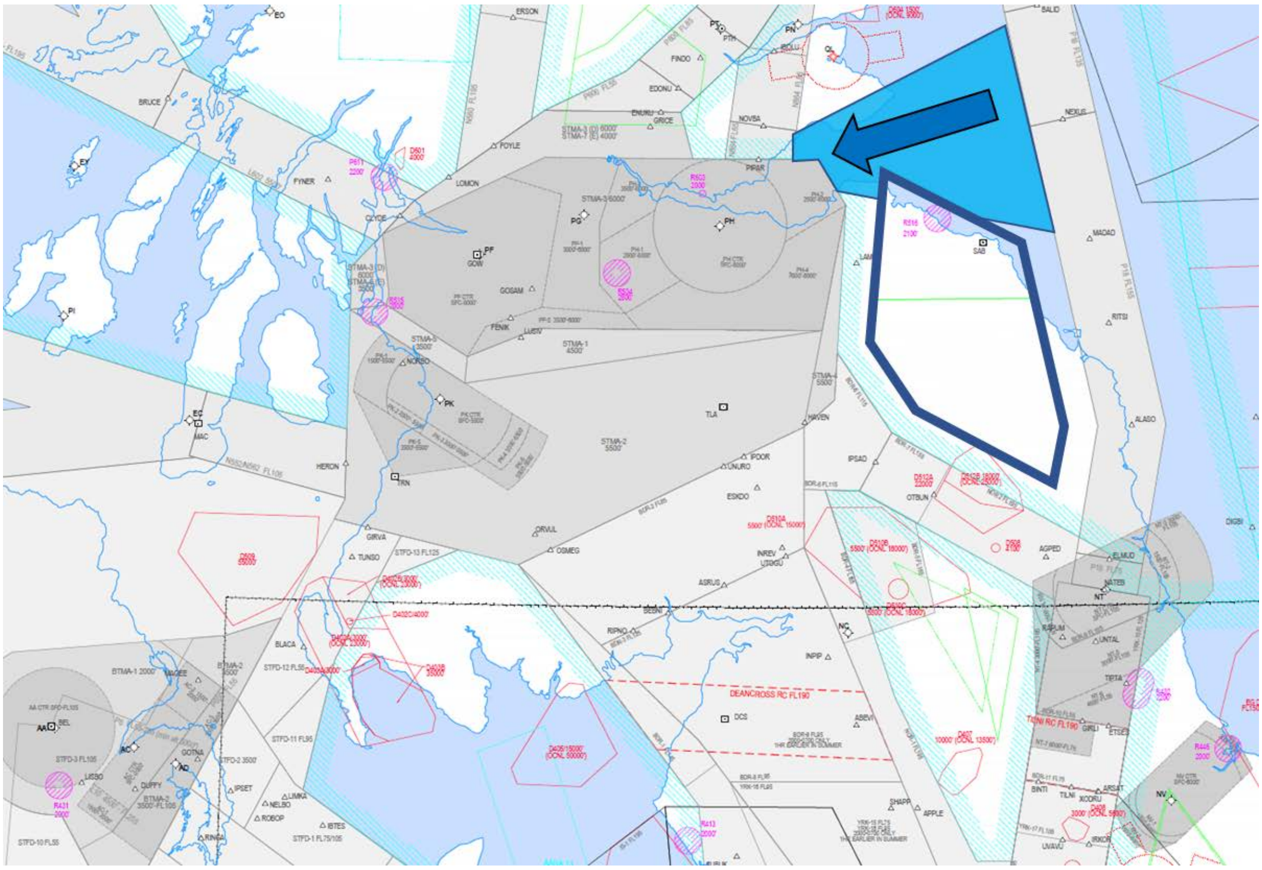

Figure 15: Adapted internal Airspace map showing the Eastern element Concept 2- West bound only route which avoids the gliding area

5.17 The approach used for Concept 2 is to introduce a west bound only route which connects FRA to the ScTMA airspace.

5.18 This Concept will provide more direct arrival options for aircraft arriving at the ScTMA airfields from FRA to the east whilst avoiding the Northumbria Gliding area.

5.19 Connectivity from P18 could be provided enabling an alternate arrival route into the ScTMA.

5.20 Concept 2 will provide capacity benefits by redistributing aircraft arriving from northern Europe via P600, N864 and Y96 to this more direct route and subsequently reducing conflictions within the ScTMA reducing controller workload.

5.21 An arrival only route in this area will offer substantial fuel savings and is likely to reduce population overflight for aircraft arriving at the ScTMA airfields electing to use this route due to reduced track miles over land.

Benefits

- Reduction in CO_2 and fuel for arrivals
- Could facilitate the reduction of CAS elsewhere in the ScTMA
- Reduction in controller workload
- Enables a likely reduction in population overflown

Issues

- No departure options
- CO_2 and fuel benefit not maximised by avoiding gliding area
- Additional CAS required (potentially mitigated by the release of other CAS elsewhere).

Conclusion

5.22 This Concept had promising aspects; however, it may require a large area of additional CAS. This Concept does not offer a departure option nor does the concept allow for the most direct routes as the gliding area has to be avoided. These two factors limit the available benefit which would be used to offset the additional CAS required. As such this Concept is not as good as one that offers both arrival and departure options and impacts the gliding area.

5.23 Design Principle Evaluation concluded that:

- 8 design principles were "Met"
- 3 design principles were "Partially Met" (2 High, 1 Med)
- 2 design principles were "Not Met" (1 High, 1 Med).

5.24 Please see Annex D: Design Principle Evaluation for detailed analysis.

This Concept was **Rejected** for further consideration as it did not meet the progression requirements set for the Design Principle Evaluation.

Concept 3: Bi-directional route avoiding gliding area

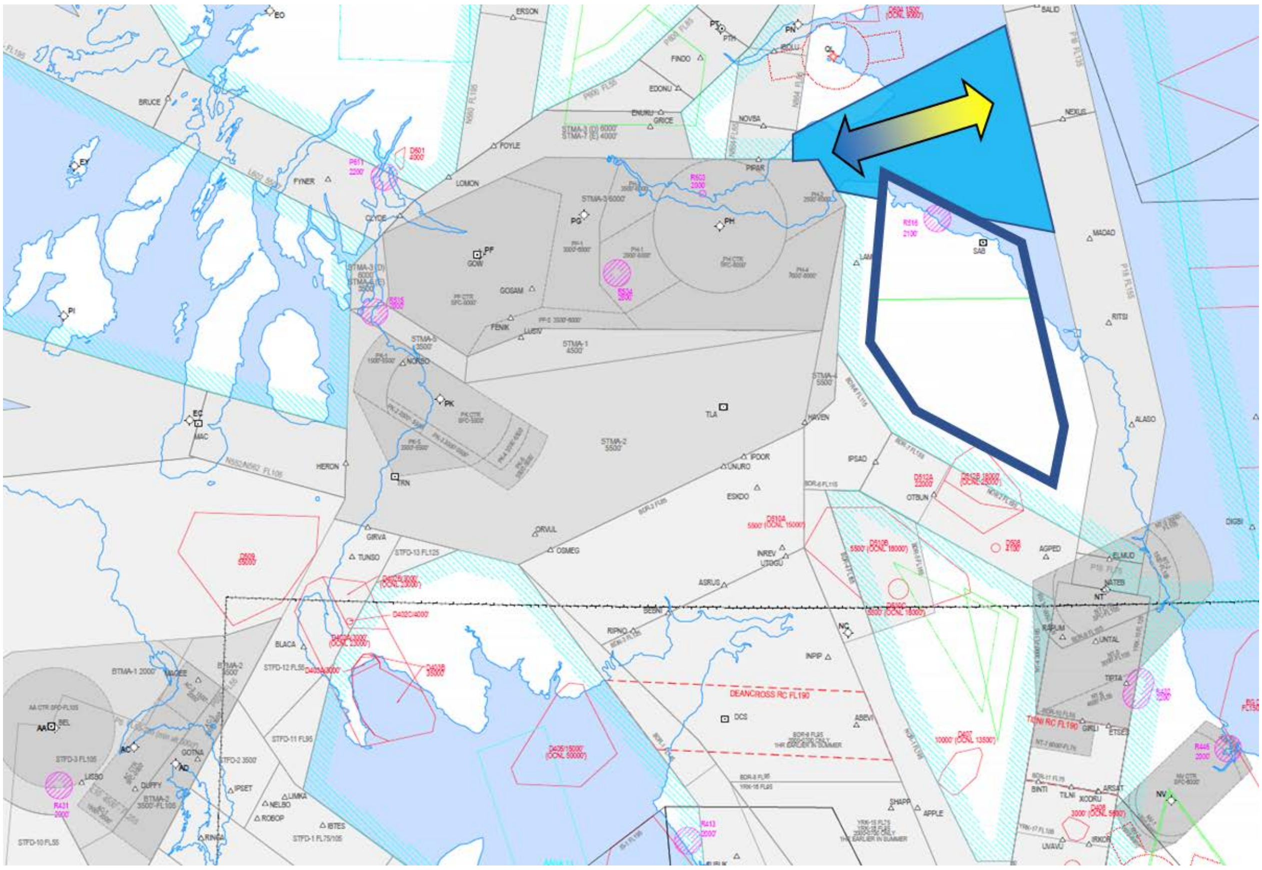

Figure 16: Adapted internal Airspace map showing the Eastern element Concept 3- Bidirectional route which avoids the gliding area

5.25 The approach used for Concept 3 is to introduce a bidirectional route which will provide connectivity between FRA to the ScTMA airspace.

5.26 This Concept will provide more direct arrival and departure options for aircraft between the ScTMA airfields from FRA to the east whilst avoiding the Northumbria Gliding area.

5.27 Connectivity from P18 could be provided enabling an alternate arrival and departure route between the ScTMA and the ATS route network.

5.28 Concept 3 will provide capacity benefits by redistributing aircraft arriving from northern Europe via P600, N864 and Y96 to this more direct route and subsequently reducing conflictions within the ScTMA reducing controller workload.

5.29 An arrival and departure route in this area will offer substantial fuel savings and is likely to reduce population overflight for aircraft arriving and departing the ScTMA airfields electing to use this route due to reduced track miles over land.

5.30 However, the use of a bidirectional route does not offer any of the additional benefits achieved through systemisation.

Benefits

- Reduction in CO_2 and fuel for arrivals and departures
- Could facilitate the reduction of CAS elsewhere in the ScTMA
- Increase in capacity through the addition of new arrival and departure routes
- Enables a likely reduction in population overflown

Issues

- Increase in controller workload within the eastern element due to vectoring
- CO_2 and fuel benefit not maximised by avoiding gliding area
- Additional CAS required (potentially mitigated by the release of other CAS elsewhere)
- Arrival and departure routes not deconflicted

Conclusion

5.31 This Concept had promising aspects; however, it will require a large area of additional CAS. This Concept offers departure and arrival options, but these routes are not deconflicted and could require ATCO intervention to resolve conflictions. This concept does not allow for the most direct routes as the gliding area has to be avoided. Although substantial benefit is still expected, this is limited by not impacting the gliding area. As such this Concept is not as good as one that impacts the gliding area and makes use of systemisation.

5.32 Design Principle Evaluation concluded that:

- 10 design principles were "Met"
- 2 design principles were "Partially Met" (1 High, 1 Med)
- 1 design principles were "Not Met" (0 High, 1 Med).

5.33 Please see Annex D: Design Principle Evaluation for detailed analysis.

This Concept was **Rejected** for further consideration as it did not meet the progression requirements set for the Design Principle Evaluation.

Concept 4: Systemised routes avoiding gliding area

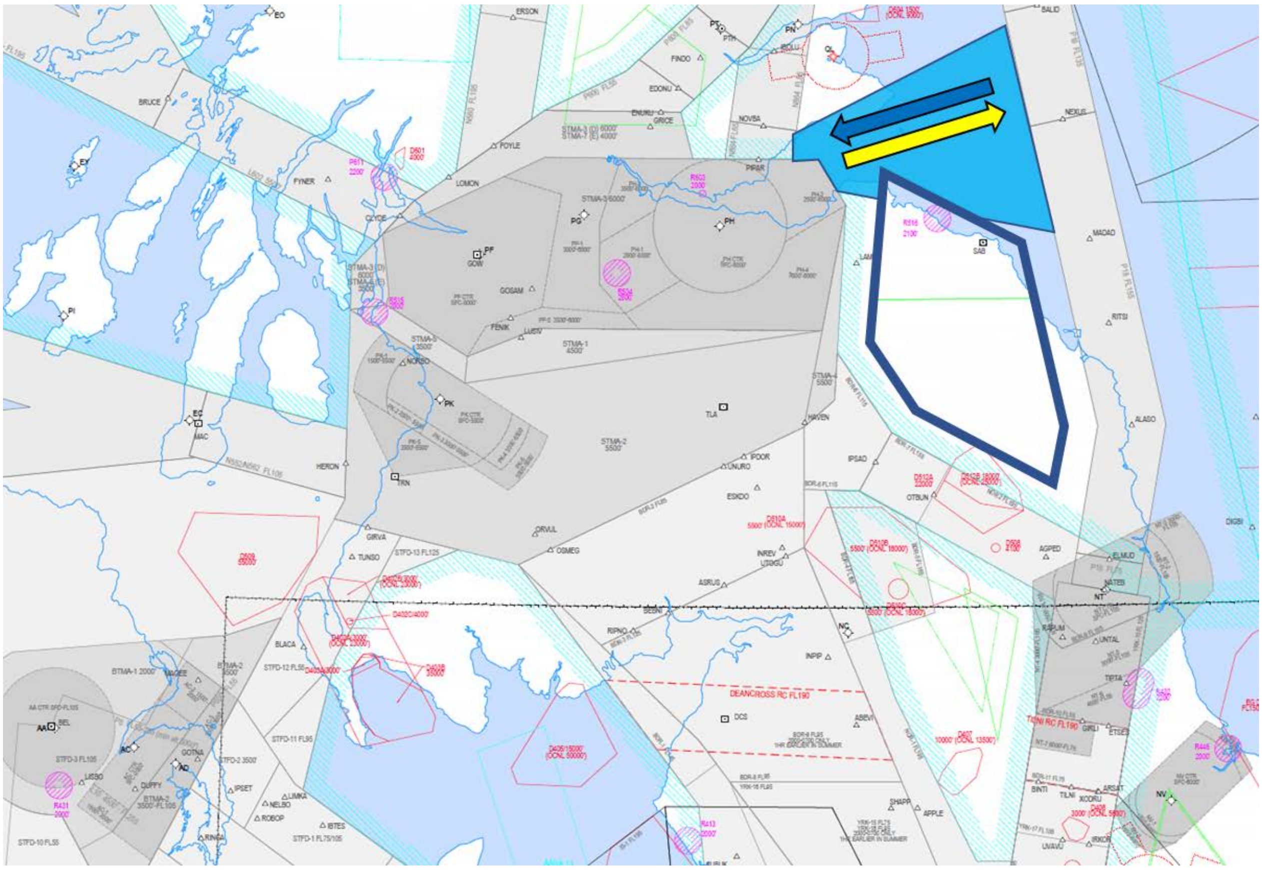

Figure 17: Adapted internal Airspace map showing the Eastern element Concept 4- Systemised route structure which avoids the gliding area

5.34 The approach used for Concept 4 is to introduce a systemised route structure which will provide connectivity between FRA to the ScTMA airspace.

5.35 This Concept will provide more direct arrival and departure options for aircraft between the ScTMA airfields from Northern Europe FRA whilst avoiding the Northumbria Gliding area.

5.36 Connectivity from P18 could be provided enabling an alternate arrival and departure route between the ScTMA and the ATS route network.

5.37 Concept 4 will provide capacity benefits by redistributing aircraft arriving from northern Europe via P600, N864 and Y96 to this more direct route and subsequently reducing conflictions within the ScTMA reducing controller workload.

5.38 The use of a systemised airspace structure will ensure aircraft arriving and departing the ScTMA remain deconflicted further reducing controller workload whilst increasing capacity and resilience.

5.39 A systemised arrival and departure route in this area will offer substantial fuel savings and is likely to reduce population overflight for aircraft arriving/departing the ScTMA airfields electing to use this route due to reduced track miles over land.

Benefits

- Reduction in CO_2 and fuel for departures and arrivals
- Could facilitate the reduction of CAS elsewhere in the ScTMA
- Reduction in controller workload
- Enables a likely reduction in population overflown
- Systemised airspace structure deconflicts arriving and departing aircraft

Issues

- CO_2 and fuel benefit not maximised by avoiding gliding area
- Additional CAS required (potentially mitigated by the release of other CAS elsewhere).

Conclusion

5.40 The systemised PBN routes offers deconflicted departure and arrival options requiring minimal controller tactical intervention. This concept does not allow for the most direct routes as the gliding area has to be avoided. Although substantial benefit is still expected, this is limited by not impacting the gliding area. As such this Concept could be improved by impacting the gliding area, Concept 9.

5.41 Design Principle Evaluation concluded that:

- 10 design principles were "Met"
- 2 design principles were "Partially Met" (2 Med)
- 1 design principles were "Not Met" (0 High, 1 Med).

5.42 Please see Annex D: Design Principle Evaluation for detailed analysis.

This Concept was accepted and **progressed** for further consideration in the initial options appraisal.

The following 4 Concepts, Concepts 5-8, build on the Eastern element Concepts 1-4 by providing additional benefit by allowing any changes to impact the Northern edge of the Northumbria Gliding area.

Concept 5: East bound route only impacting gliding area

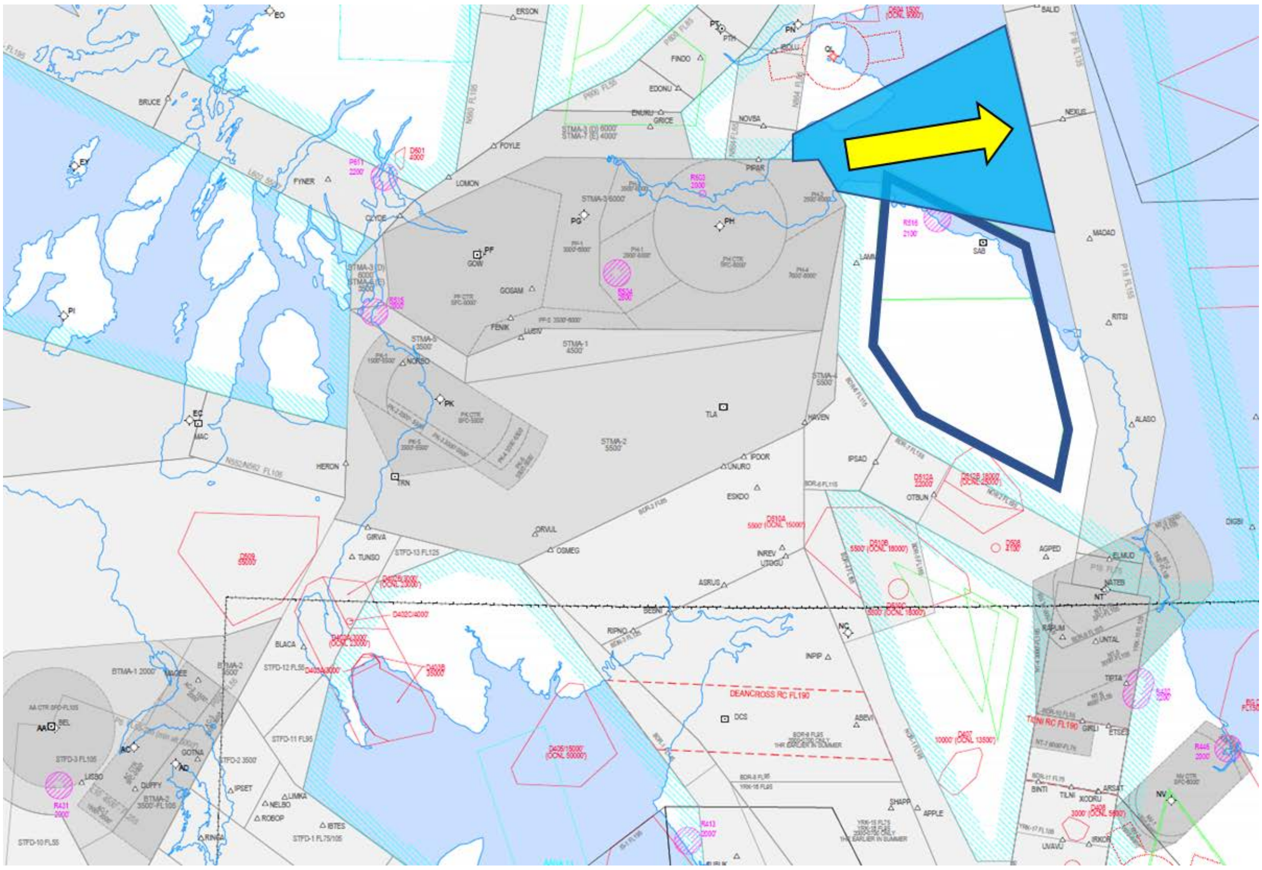

Figure 18: Adapted internal Airspace map showing the Eastern element Concept 5- East bound only route which impacts the gliding area

5.43 The approach used for Concept 5 is to build on Concept 1 by allowing the proposed east bound only route (Concept 1) which connects the ScTMA airspace with FRA to transit the Northumbria gliding area which may impact their operations.

5.44 This Concept has been developed through stakeholder engagement to accommodate both GA and network requirements and has been offset by enabling increased access to the remaining gliding area.

5.45 By removing the requirement to avoid the Northumbria gliding area, NERL can introduce straighter, more direct routes, further enhancing the environmental and economic benefits over Concept 1 for aircraft departing the ScTMA airfields towards FRA to the east.

5.46 Connectivity to P18 could be provided enabling an alternate departure route from the ScTMA.

5.47 Concept 5 will provide capacity benefits by redistributing aircraft destined for northern Europe from P600, N864 and Y96 to this more direct route and subsequently reducing conflictions within the ScTMA reducing controller workload.

5.48 A departure only route in this area will offer substantial fuel savings and is likely to reduce population overflight for aircraft departing the ScTMA airfields electing to use this route due to reduced track miles over land.

Benefits

- Reduction in CO_2 and fuel for departures
- Could facilitate the reduction of CAS elsewhere in the ScTMA
- Reduction in controller workload within other elements
- Enables a likely reduction in population overflown
- CO_2 and fuel benefit maximised by allowing route to impact the Northumbria Gliding area

Issues

- No arrival options
- Additional CAS required (potentially mitigated by the release of other CAS elsewhere).

Conclusion

5.49 This Concept improves Concept 1 by allowing routes to impact the gliding area. However, it may still require a large area of additional CAS. By not providing an arrival option, the available benefit which could be used to offset the additional CAS required is limited. As such this Concept is not as good as one that offers both arrival and departure options.

5.50 Design Principle Evaluation concluded that:

- 6 design principles were "Met"
- 5 design principles were "Partially Met" (2 High, 3 Med)
- 2 design principles were "Not Met" (1 High, 1 Med).

5.51 Please see Annex D: Design Principle Evaluation for detailed analysis.

5.52 This Concept was **Rejected** for further consideration as it did not meet the progression requirements set for the Design Principle Evaluation.

Concept 6: West bound route only impacting gliding area

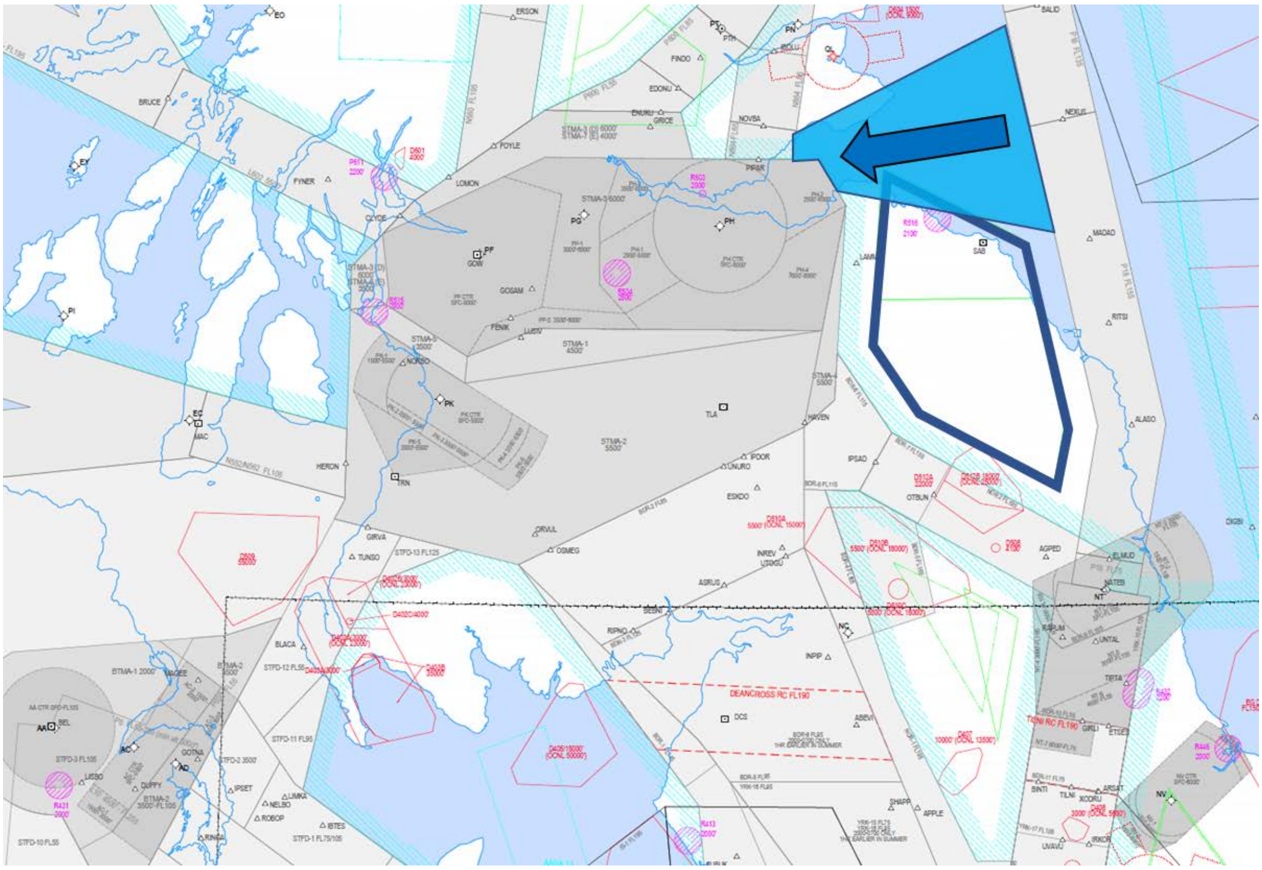

Figure 19: Adapted internal Airspace map showing the Eastern element Concept 6- West bound only route which impacts the gliding area

5.53 The approach used for Concept 6 is to build on Concept 2 by allowing the proposed west bound only route (Concept 2) which connects FRA to the ScTMA airspace to transit the Northumbria gliding area which may impact their operations.

5.54 This Concept has been developed through stakeholder engagement to accommodate both GA and network requirements and has been offset by enabling increased access to the remaining gliding area.

5.55 By removing the requirement to avoid the Northumbria gliding area, NERL can introduce straighter, more direct routes, further enhancing the environmental and economic benefits over Concept 2 for aircraft arriving at the ScTMA airfields from FRA to the east.

5.56 Connectivity from P18 could be provided enabling an alternate arrival route into the ScTMA.

5.57 Concept 6 will provide capacity benefits by redistributing aircraft arriving from northern Europe via P600, N864 and Y96 to this more direct route and subsequently reducing conflictions within the ScTMA reducing controller workload.

5.58 An arrival only route in this area will offer substantial fuel savings and is likely to reduce population overflight for aircraft arriving at the ScTMA airfields electing to use this route due to reduced track miles over land.

Benefits

- Reduction in CO_2 and fuel for arrivals
- Could facilitate the reduction of CAS elsewhere in the ScTMA
- Reduction in controller workload within ither elements
- Enables a likely reduction in population overflown
- CO_2 and fuel benefit maximised by allowing route to impact the Northumbria Gliding area

Issues

- No departure options
- Additional CAS required (potentially mitigated by the release of other CAS elsewhere).

Conclusion

5.59 This Concept improves Concept 2 by allowing routes to impact the gliding area. However, it may still require a large area of additional CAS. By not providing a departure option, the available benefit which could be used to offset the additional CAS required is limited. As such this Concept is not as good as one that offers both arrival and departure options.

5.60 Design Principle Evaluation concluded that:

- 6 design principles were "Met"
- 5 design principles were "Partially Met" (2 High, 3 Med)
- 2 design principles were "Not Met" (1 High, 1 Med).

5.61 Please see Annex D: Design Principle Evaluation for detailed analysis.

5.62 This Concept was Rejected for further consideration as it did not meet the progression requirements set for the Design Principle Evaluation.

Concept 7: Bi-directional route impacting gliding area

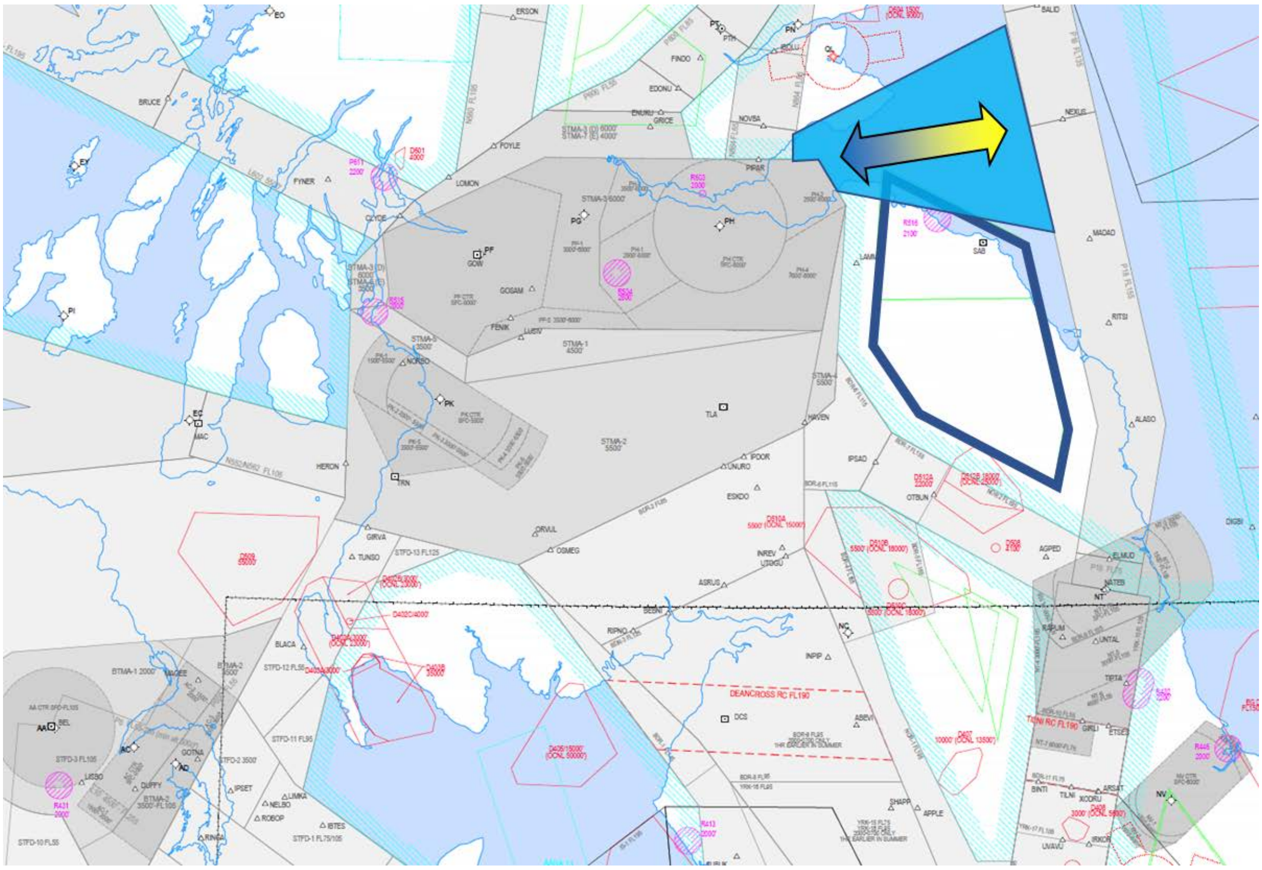

Figure 20: Adapted internal Airspace map showing the Eastern element Concept 7- Bidirectional route which impacts the gliding area

5.63 The approach used for Concept 7 is to is to build on Concept 3 by allowing the proposed bidirectional route (Concept 3) which will provide connectivity between FRA and the ScTMA airspace to transit the Northumbria gliding area which may impact their operations.

5.64 This Concept has been developed through stakeholder engagement to accommodate both GA and network requirements and has been offset by enabling increased access to the remaining gliding area.

5.65 By removing the requirement to avoid the Northumbria gliding area, NERL can introduce straighter, more direct routes, further enhancing the environmental and economic benefits over Concept 3 for aircraft departing and arriving at the ScTMA airfields to/ from FRA to the east.

5.66 Connectivity from P18 could be provided enabling an alternate arrival and departure route between the ScTMA and the ATS route network.

5.67 Concept 7 will provide capacity benefits by redistributing aircraft arriving from northern Europe via P600, N864 and Y96 to this more direct route and subsequently reducing conflictions within the ScTMA reducing controller workload.

5.68 An arrival and departure route in this area will offer substantial fuel savings and is likely to reduce population overflight for aircraft arriving/departing the ScTMA airfields electing to use this route due to reduced track miles over land. However, the use of a bidirectional route does not offer any of the additional benefits achieved through systemisation.

Benefits

- Reduction in CO_2 and fuel for arrivals and departures
- Could facilitate the reduction of CAS elsewhere in the ScTMA
- Increase in capacity through the addition of new arrival and departure routes
- Enables a likely reduction in population overflown
- CO_2 and fuel benefit maximised by impacting gliding area

Issues

- Increase in controller workload due vectoring
- Additional CAS required (potentially mitigated by the release of other CAS elsewhere)
- Arrival and departure routes not deconflicted

Conclusion

5.69 This Concept improves Concept 3 by allowing routes to impact the gliding area. However, it may require a large area of additional CAS. This Concept offers departure and arrival options, but these routes are not deconflicted and could require ATCO intervention to resolve conflictions. As such this Concept is not as good as one that makes use of systemisation.

5.70 Design Principle Evaluation concluded that:

- 9 design principles were "Met"
- 3 design principles were "Partially Met" (1 High, 2 Med)
- 1 design principles were "Not Met" (0 High, 1 Med).

5.71 Please see Annex D: Design Principle Evaluation for detailed analysis.

This Concept was **Rejected** for further consideration as it did not meet the progression requirements set for the Design Principle Evaluation.

Concept 8: Systemised routes impacting gliding area

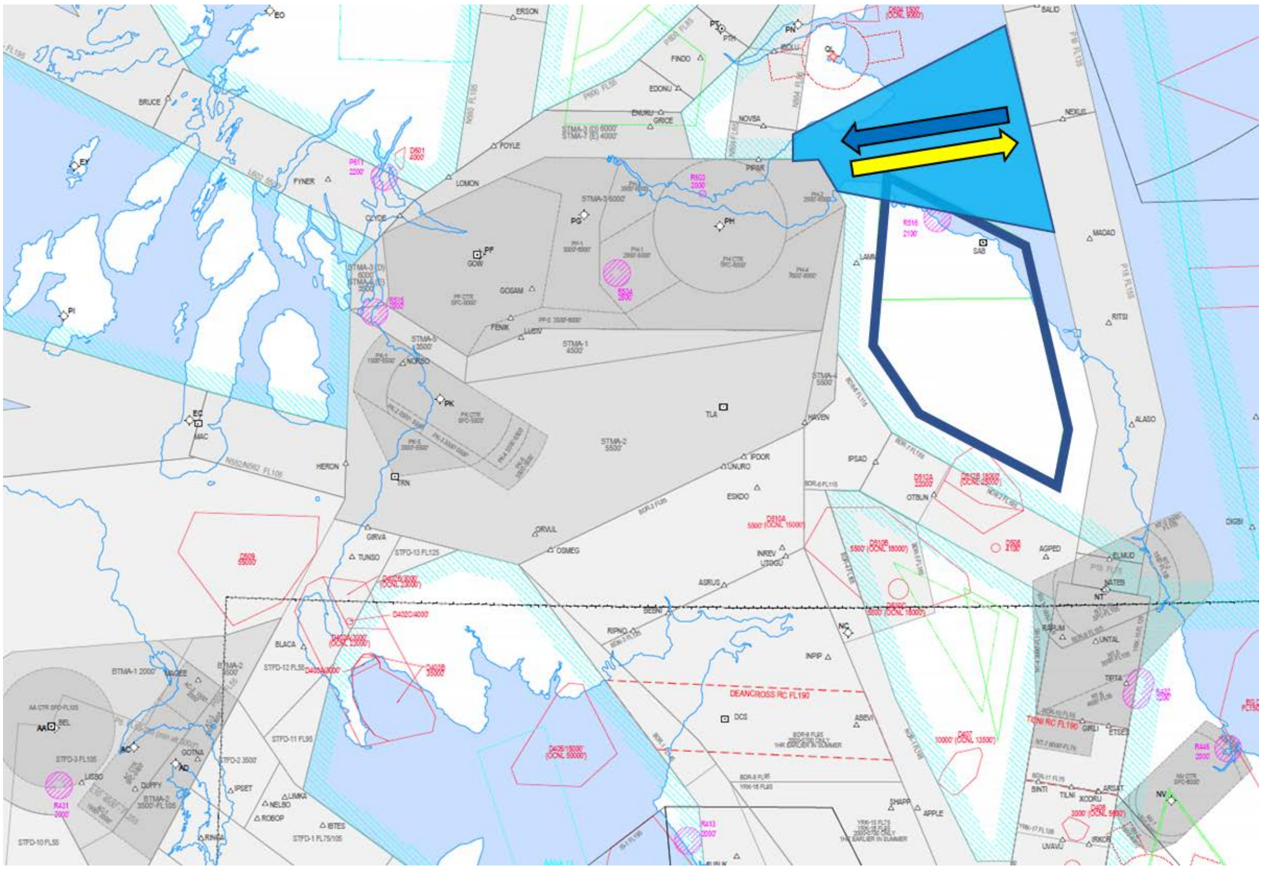

Figure 21: Adapted internal Airspace map showing the Eastern element Concept 8- Systemised route which impacts the gliding area

5.72 The approach used for Concept 8 is to build on Concept 4 by allowing the proposed systemised route structure (Concept 4) which will provide connectivity between FRA and the ScTMA airspace to transit the Northumbria gliding area which may impact their operations.

5.73 This Concept has been developed through stakeholder engagement to accommodate both GA and network requirements and has been offset by enabling increased access to the remaining gliding area.

5.74 By removing the requirement to avoid the Northumbria gliding area, NERL can introduce straighter, more direct routes, further enhancing the environmental and economic benefits over Concept 4 for aircraft departing and arriving at the ScTMA airfields to/ from FRA to the east.

5.75 Connectivity from P18 could be provided enabling an alternate arrival and departure route between the ScTMA and the ATS route network.

5.76 Concept 8 will provide capacity benefits by redistributing aircraft arriving from northern Europe via P600, N864 and Y96 to this more direct route and subsequently reducing conflictions within the ScTMA reducing controller workload.

5.77 The use of a systemised airspace structure will ensure aircraft arriving and departing the ScTMA remain deconflicted further reducing controller workload whilst increasing capacity and resilience.

5.78 A systemised arrival and departure route in this area will offer substantial fuel and is likely to reduce population overflight for aircraft arriving/departing the ScTMA airfields electing to use this route due to reduced track miles over land.

Benefits

- Reduction in CO_2 and fuel for departures and arrivals
- Could facilitate the reduction of CAS elsewhere in the ScTMA
- Reduction in controller workload
- Enables a likely reduction in population overflown
- Systemised airspace structure deconflicts arriving and departing aircraft
- CO_2 and fuel benefit maximised by impacting gliding area

Issues

- Additional CAS required (potentially mitigated by the release of other CAS elsewhere).

Conclusion

5.79 Systemised PBN routes offers deconflicted departure and arrival options requiring minimal controller tactical intervention. This concept allows for the most direct routes available as the gliding area can be transited delivering substantial benefit.

5.80 Design Principle Evaluation concluded that:

- 10 design principles were "Met"
- 2 design principles were "Partially Met" (0 High, 2 Med)
- 1 design principles were "Not Met" (0 High, 1 Med).

5.81 Please see Annex D: Design Principle Evaluation for detailed analysis.

This Concept was accepted and progressed for further consideration in the initial options appraisal and is NERL preferred solution for the Eastern element.

South-Eastern Element

The South-Eastern element seeks review and improve the existing ATS route structure surrounding the connectivity between NATEB and HAVEN.

Concept 0: Baseline

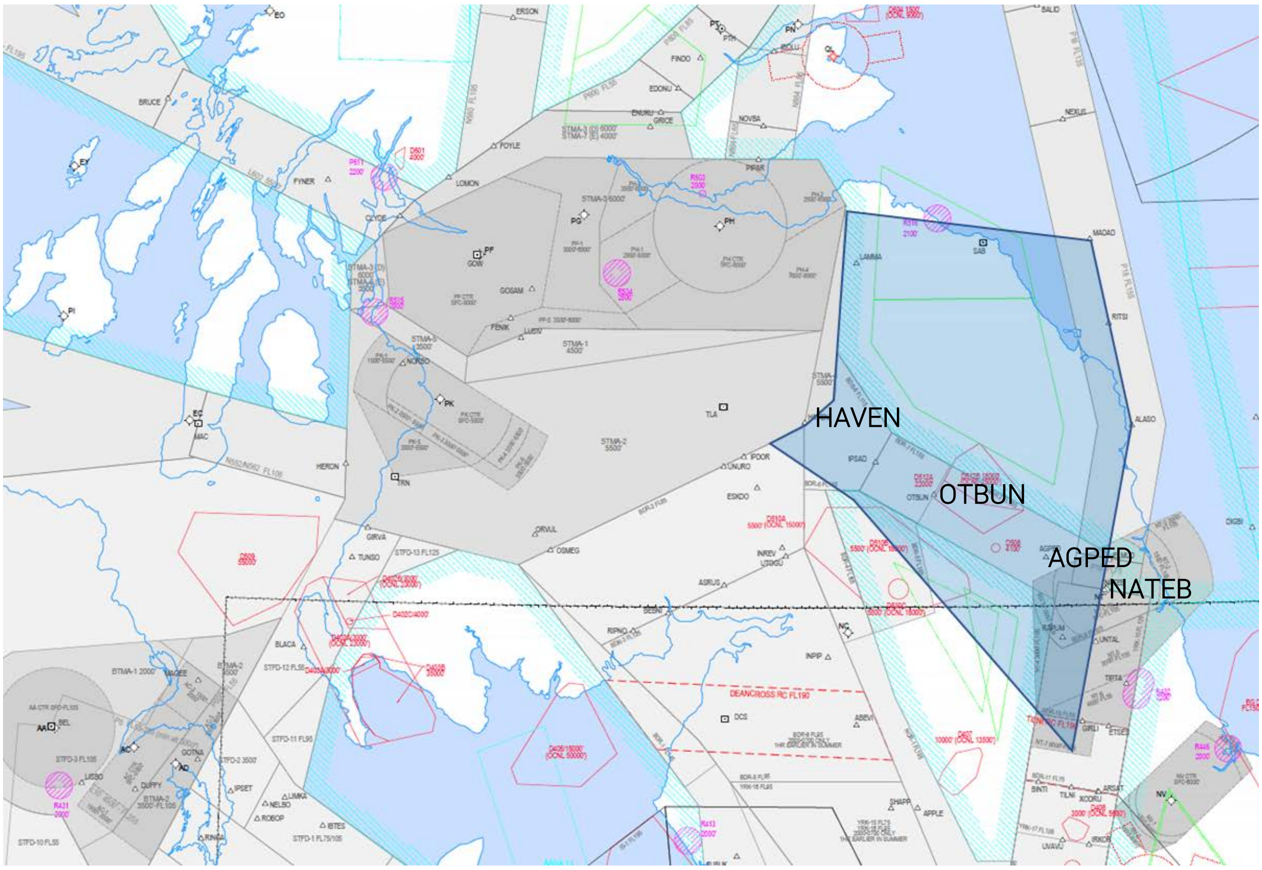

Figure 22: Adapted internal Airspace map showing the Lateral limits of the Eastern Element and surrounding airspace.

5.82 A 'Do-Nothing' option representing the current day operation must be included and is used as the baseline against which all other Concepts are compared.

5.83 The South-eastern element accommodates traffic arriving and departing the ScTMA from Northern Europe and the East via the existing Bidirectional airway, Y96.

5.84 The base of this airway between NATEB and HAVEN, the limits of the airway within this element are shown in Figure 23. Below these levels it is Class G airspace.

5.85 Danger area 512A/B (Otterburn) is situated between AGPED and OTBUN with published vertical limits of SFC-22,000/18,000 ft. After discussion, the MoD are considering usage and extent and if access and dimensions can be improved.

5.86 SME feedback has identified that aircraft currently arriving at the ScTMA along Y96 do not have an optimal descent profile as the published base of this airway prevents aircraft following an optimised descent profile. This results in aircraft arriving high in the ScTMA increasing the overall workload and complexity of their arrivals

5.87 To the south of this airway is the Spadeadam DA complex and to the North is the Northumbria Gliding area.

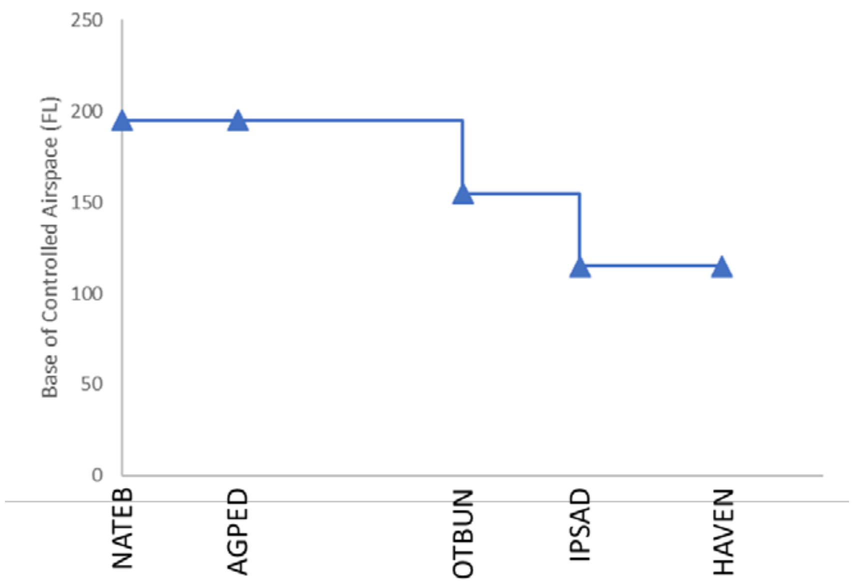

Figure 23: Base of Y96 between HAVEN and NATEB.

5.88 The 'Do-Nothing' option is **Rejected** since it would bring no benefit and did not meet the progression requirements set for the Design Principle Evaluation.

Stakeholder feedback relevant to design element

Stakeholder	Feedback	Impact
MoD	MoD would like to highlight their ACP relating to TDA597 and their continued access	The MoD ACP will be assessed for any interdependencies with this FASI-N ScTMA submission
BaE Warton	BaE Warton would like to ensure access to Spadeadam (D510 complex) is maintained	BaE Warton's continued access will be a consideration as designs are developed
EGPH/ BGA/ LAA	Combining the northern and southern Elements of the Northumberland Gliding area was viewed as a positive change	This will be considered in the development of the South-Eastern element concepts
Millfield Gliding	Amending the western boundary of the Northumberland gliding could impact Millfield operations	We will continue to engage with Millfield Gliding as design options are developed to minimise any impact
Millfield Gliding	The MoD proposed Temporary Danger Area (TDA597) erodes Class G airspace, any further reduction is unwelcome	CAS will be kept to the minimum required to deliver a safe modernised airspace

Table 18: Stakeholder feedback received pertinent to the South-Eastern element

Concept 1: Bi-directional route with lowered CAS bases

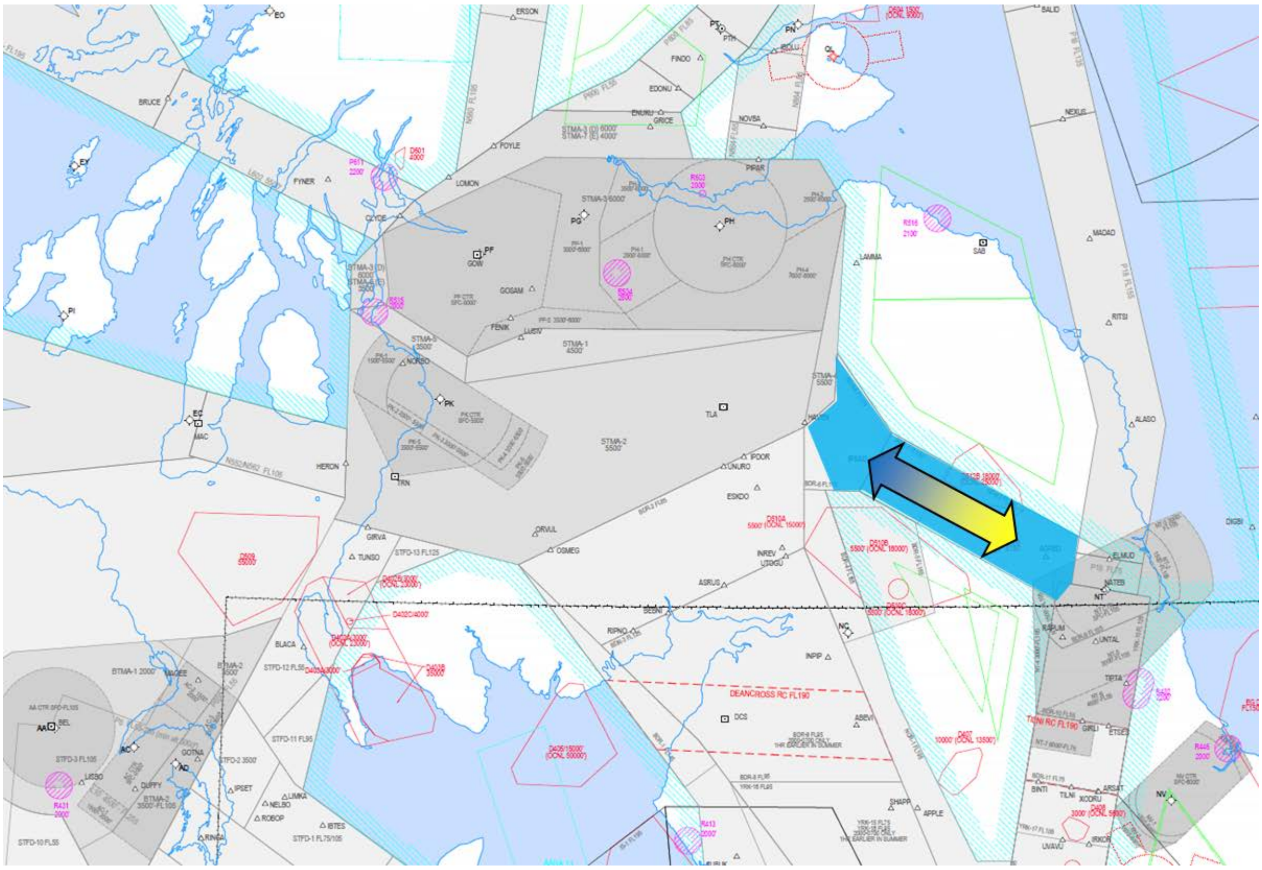

Figure 24: Adapted internal Airspace map showing the South-Eastern Element Concept 1- Bi-directional route with lowered CAS bases

5.89 The approach used for Concept 1 is to maintain the existing Bidirectional Y96 but lower the base of this airway (Figure 25), where appropriate, facilitating an improved descent profile into the ScTMA.

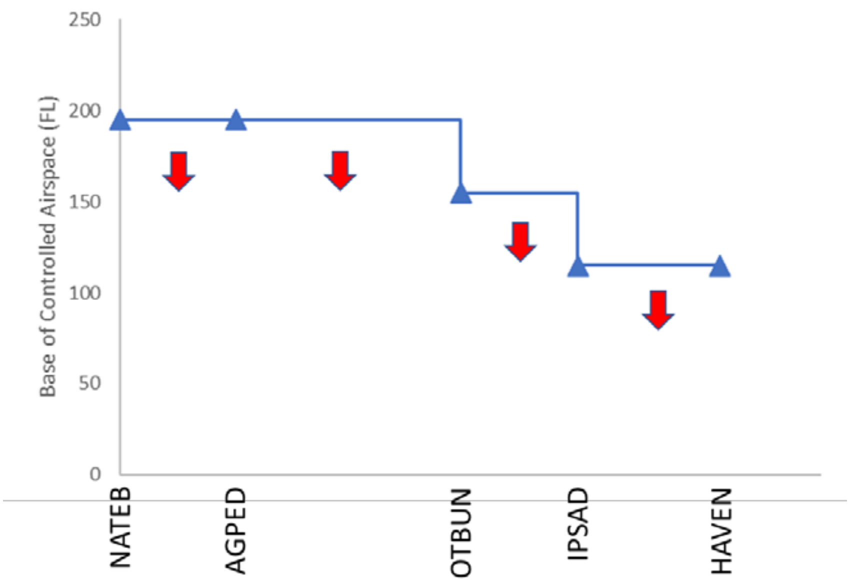

Figure 25: Indicative lowering of bases along Y96

5.90 The sustained use of a bidirectional route does not reduce potential conflictions between arriving and departing conflictions which will continue to be resolved through tactical controller intervention.

5.91 By lowering the base of CAS, arriving aircraft are able to continually descend into the ScTMA reducing controller and cockpit workload which will help accommodate forecast traffic growth.

5.92 This Concept will require a small quantity of additional CAS. However, this additional CAS is likely to be above FL100 and therefore will only have minimal impact upon GA.

5.93 Improved CDO will lead to a sight economic benefit and reduction in CO_2 emissions.

Benefits

- CO_2 and fuel benefit through a reduction in CO_2 emissions and fuel bun for arrivals
- Reduction in controller workload
- Improved descent planning for arriving aircraft

Issues

- Bidirectional routes require controller intervention to separate arriving and departing aircraft
- Additional CAS required.

Conclusion

5.94 The Concept of lowering the bases offers a slight increase in capacity as well as an economic and environmental benefit. This benefit however is off set by the potential impact on the MoD and GA through increasing the volume of CAS. Whilst this Concept offers some benefits, aircraft arriving and departing the ScTMA are not deconflicted and could require ATCO intervention to resolve conflictions. As such this Concept is not as good as one that makes use of systemisation.

5.95 Design Principle Evaluation concluded that:

- 8 design principles were “Met”
- 5 design principles were “Partially Met” (1 High, 4 Med)
- 0 design principles were “Not Met” (0 High, 0 Med).

5.96 Please see Annex D: Design Principle Evaluation for detailed analysis.

5.97 This Concept was Rejected for further consideration as it did not meet the progression requirements set for the Design Principle Evaluation.

Concept 2: Systemised route

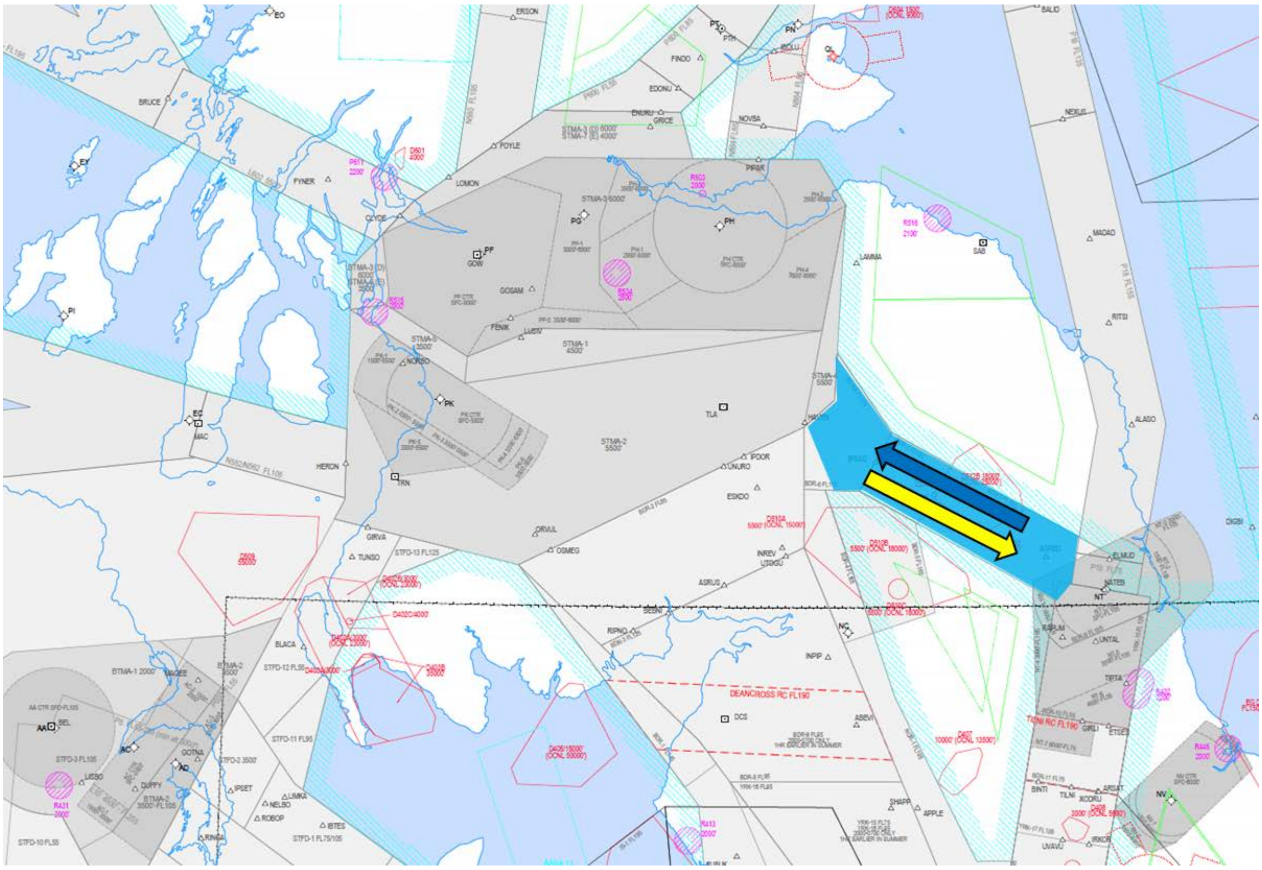

Figure 26: Adapted internal Airspace map showing the South-Eastern Element Concept 2- Systemised routes

5.98 The approach used for Concept 2 is to introduce a systemised route structure between the ScTMA and NATEB.

5.99 The introduction of a systemised route structure will provide a safety, capacity and resilience benefit by deconflicting aircraft arriving and departing the ScTMA to/from Northern Europe and the East subsequently reducing controller workload.

5.100 This Concept may require a small quantity of additional CAS to facilitate the introduction of two, opposite direction routes if designed to CAP1385 spacing requirements and uncontested adherence with the CAA Containment Policy. This additional CAS will be the minimum required to comply with the route spacing requirements and will be above FL100 and therefore will only have minimal impact upon GA and MoD.

5.101 The reduction in conflictions should lead to a slight economic and environmental benefit as aircraft are less likely to be vectored away from their flight planned routes. Departing aircraft are deconflicted from arrival aircraft so are able to climb more efficiently improving CCO. However, CDO are limited by the base of controlled airspace.

Benefits

- Increase in safety through the planned deconfliction of arriving and departing aircraft
- CO_2 and fuel benefit through improved adherence with the flight planned route
- Capacity and resilience increase by reducing controller workload by removing conflictions between arriving and departing aircraft
- CCO operations are benefited by removing conflictions with arriving aircraft

Issues

- Additional CAS required.
- No benefit to CDO

Conclusion

5.102 The introduction of a systemised airspace structure in the South-eastern element offers an increase in safety as well as providing benefits in capacity, resilience, economic and environmental benefit. However, the cost of this benefit is the potential requirement to widen the CTA's above FL100 to facilitate the introduction of these routes, potentially impacting the MoD and GA. Whilst this Concept does provide the aforementioned benefits, it does not offer any benefit or CDO as this is limited by the base of CAS.

5.103 Design Principle Evaluation concluded that:

- 8 design principles were "Met"
- 6 design principles were "Partially Met" (0 High, 6 Med)
- 0 design principles were "Not Met" (0 High, 0 Med).

5.104 Please see Annex D: Design Principle Evaluation for detailed analysis.

5.105 This Concept was **Rejected** for further consideration as it did not meet the progression requirements set for the Design Principle Evaluation.

Concept 3: Systemised route with lowered CAS bases

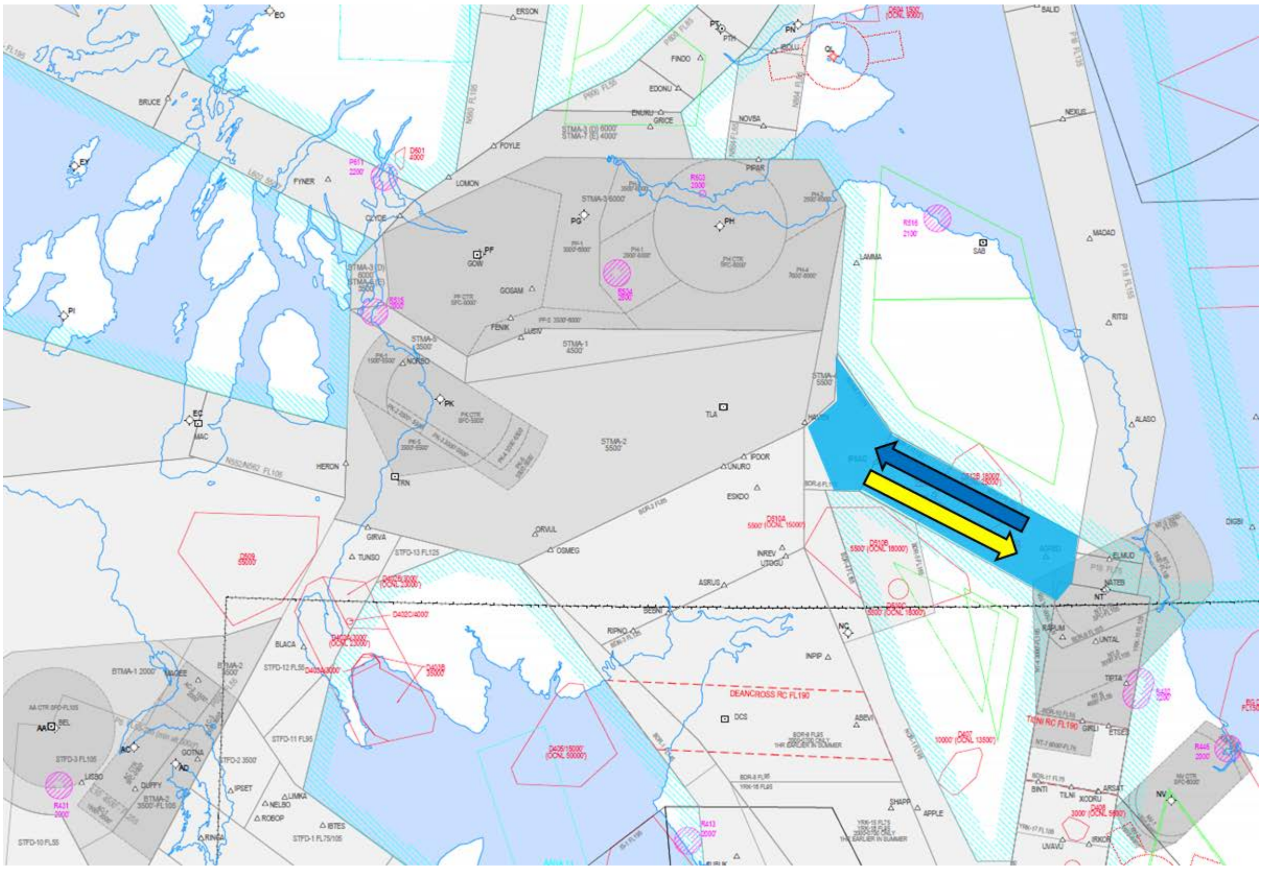

Figure 27: Adapted internal Airspace map showing the South-Eastern Element Concept 3- Systemised routes with lowered CAS bases.

5.106 The Concept 3 concept is a hybrid of Concept 1 and 2. It introduces a systemised airspace structure to deconflict arrival and departure aircraft and lowers the bases, where appropriate facilitating an improved descent profile into the ScTMA.

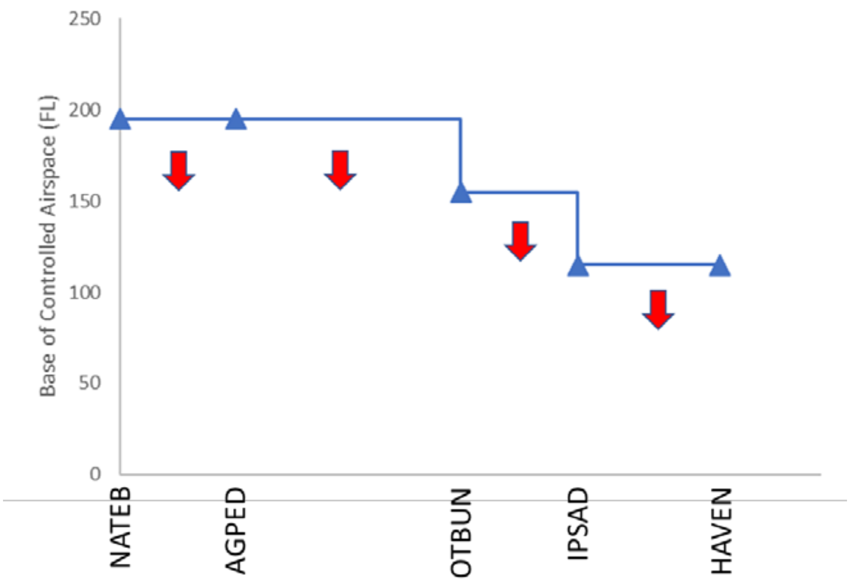

Figure 28: Indicative lowering of bases along extant Y96

5.107 By combining the two Concepts, the individual benefits of each can be realised leading to an airspace structure which enhances safety whilst delivering benefits to capacity, resilience, fuel burn and CO_2 emissions.

5.108 This is achieved through the systemisation deconflicting arrival and departure aircraft and enabling a benefit in CDO operations by lowering the base of CAS (Figure 28) removing the requirement for aircraft to level off during their arrival into the ScTMA.

5.109 Departing aircraft are deconflicted from arrival aircraft so are able to climb more efficiently improving CCO.

5.110 This Concept will require a small quantity of additional CAS. However, this additional CAS is likely to be above FL100 and therefore the expectation is that the change will only have minimal impact upon GA and MoD.

Benefits

- Increase in safety through the planned deconfliction of arriving and departing aircraft
- CO_2 and fuel benefit through improved adherence with the flight planned route
- Capacity and resilience increase by reducing controller workload by removing conflictions between arriving and departing aircraft
- CCO are benefited by removing conflictions with arriving aircraft
- CDO are benefited by lowering the base of the CTA removing the requirement of aircraft to level off and by removing conflictions with departing aircraft.

Issues

- Additional CAS required.

Conclusion

5.111 The introduction of a systemised airspace structure with lowered bases in the South-eastern element offers an increase in safety as well as providing benefits in capacity, resilience, fuel burn and CO_2 emissions. However, the cost of this benefit is the requirement for additional CAS which may impact MoD and GA operations.

5.112 Design Principle Evaluation concluded that:

- 8 design principles were "Met"
- 3 design principles were "Partially Met" (0 High, 3 Med)
- 0 design principles were "Not Met" (0 High, 0 Med).

5.113 Please see Annex D: Design Principle Evaluation for detailed analysis.

5.114 This Concept was accepted and progressed for further consideration in the initial options appraisal and is NERL preferred solution for the South-Eastern element.

Southern Element

The southern element seeks to redesign the arrival and departure flows for aircraft from or to the London FIR.

Concept 0: Baseline

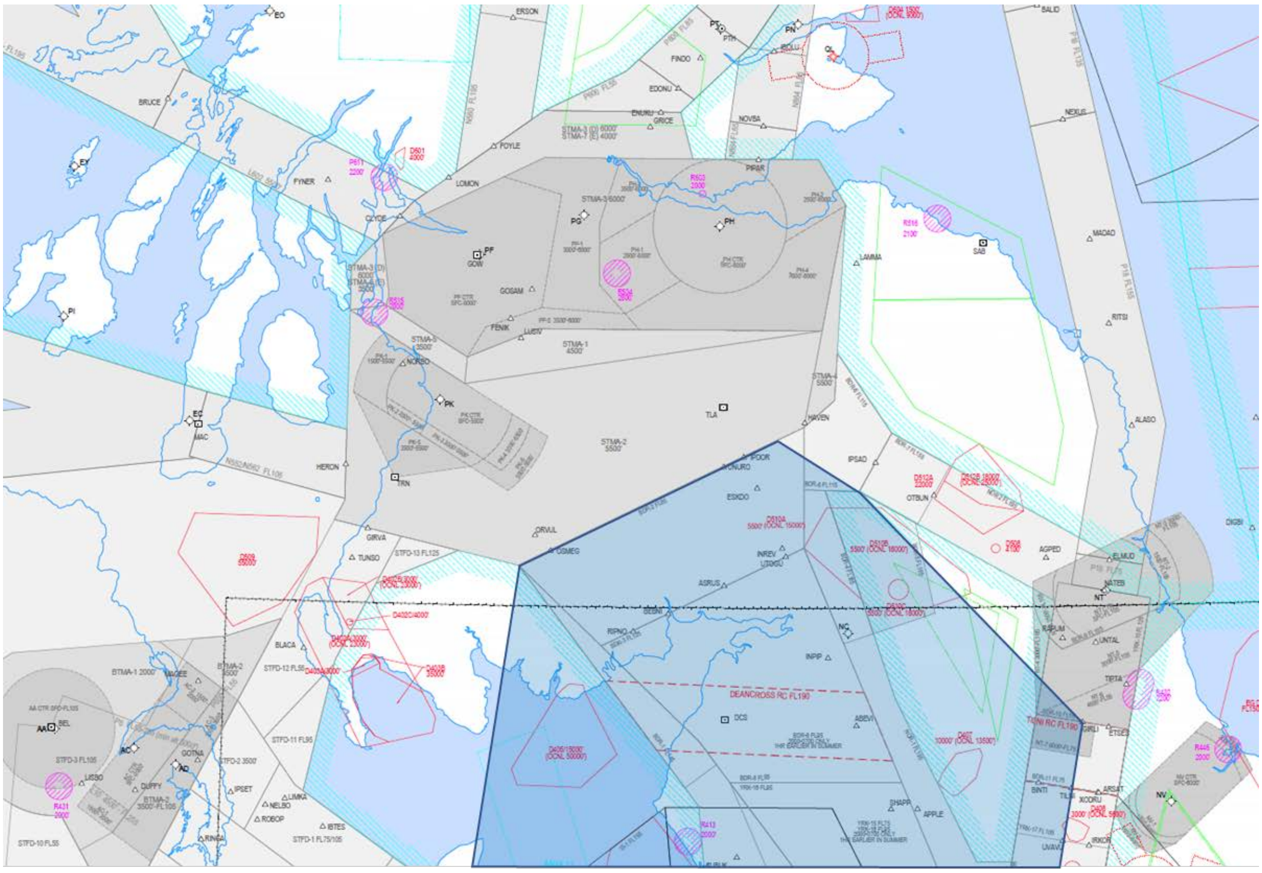

Figure 29: Adapted internal Airspace map showing the lateral limits of the Southern Element and surrounding airspace.

5.115 A 'Do-Nothing' option representing the current day operation must be included and is used as the baseline against which all other Concepts are compared.

5.116 The Southern Element accommodates traffic arriving and departing the ScTMA from the central Europe and provides the connectivity to the southern UK airspace.

5.117 The existing airspace is constructed of the following CTA's: Below these CTA's is Class G airspace.

- Northern 1 (FL195 – 245)
- Yorkshire 4 (FL125 – 195)
- Yorkshire 7(FL145 – 195)
- Yorkshire 15 (FL75 – 125)
- Yorkshire 16 (FL95 – 125)
- Borders 1 (FL135 – 195)
- Borders 2 (FL85 – 195)
- Borders 3 (FL125 – 195)
- Borders 4 (FL165 – 195)
- Borders 6 (FL115 – 195)
- Borders 8 (FL95 – 125)

5.118 These CTA's contain the lower airspace routes T256, L612, N864, N601 which were historically defined by the location of ground-based Navigation Aids (NavAids). These routes converge on the Dean Cross (DCS) and TALLA (TLA) VHF Omnidirectional Range NavAids (VOR). As such these routes do not provide the most direct connectivity between the southern UK airspace and the TMA.

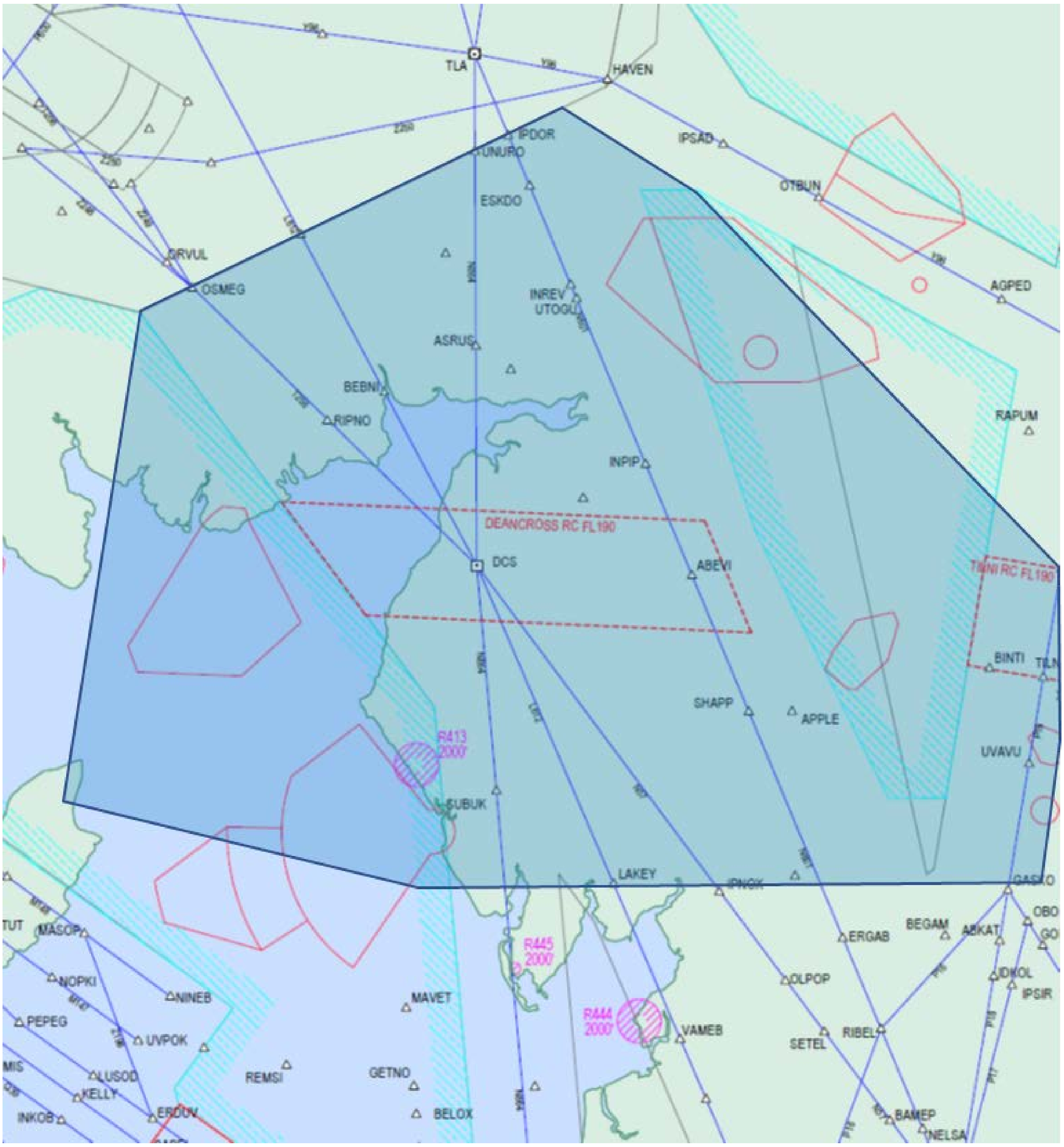

Figure 30: Adapted internal airspace map showing the Lower level routes contained within the lateral limits of the southern element.

5.119 Within this area the following airspace structures exist which will be considered in any airspace design:

- D405 Kirkkudbright
- D406 Eskmeals
- D407 Warcop
- D510 Spadeadam

- Dean Cross Radar Corridor (activated on request)
- R413 Sellafield

5.120 The existing route structure within the Southern element orientates north bound traffic (ScTMA arrivals) on the east side and south bound traffic (ScTMA departures on the west side). This serves to keep arrival and departure traffic separated and aligns with the existing network to the south. Overflying traffic also adopts this general orientation scheme.

5.121 SME feedback has identified that improved CDOs are limited by the existing base of CAS in this element and that there are opportunities to release CAS as there are underutilised areas of CAS.

5.122 The 'Do-Nothing' option is Rejected since it would bring no benefit and did not meet the progression requirements set for the Design Principle Evaluation.

Stakeholder feedback relevant to design element

5.123 The feedback received in relation to this design element did not influence the development of the element concepts.

Concept 1: Bidirectional Routes

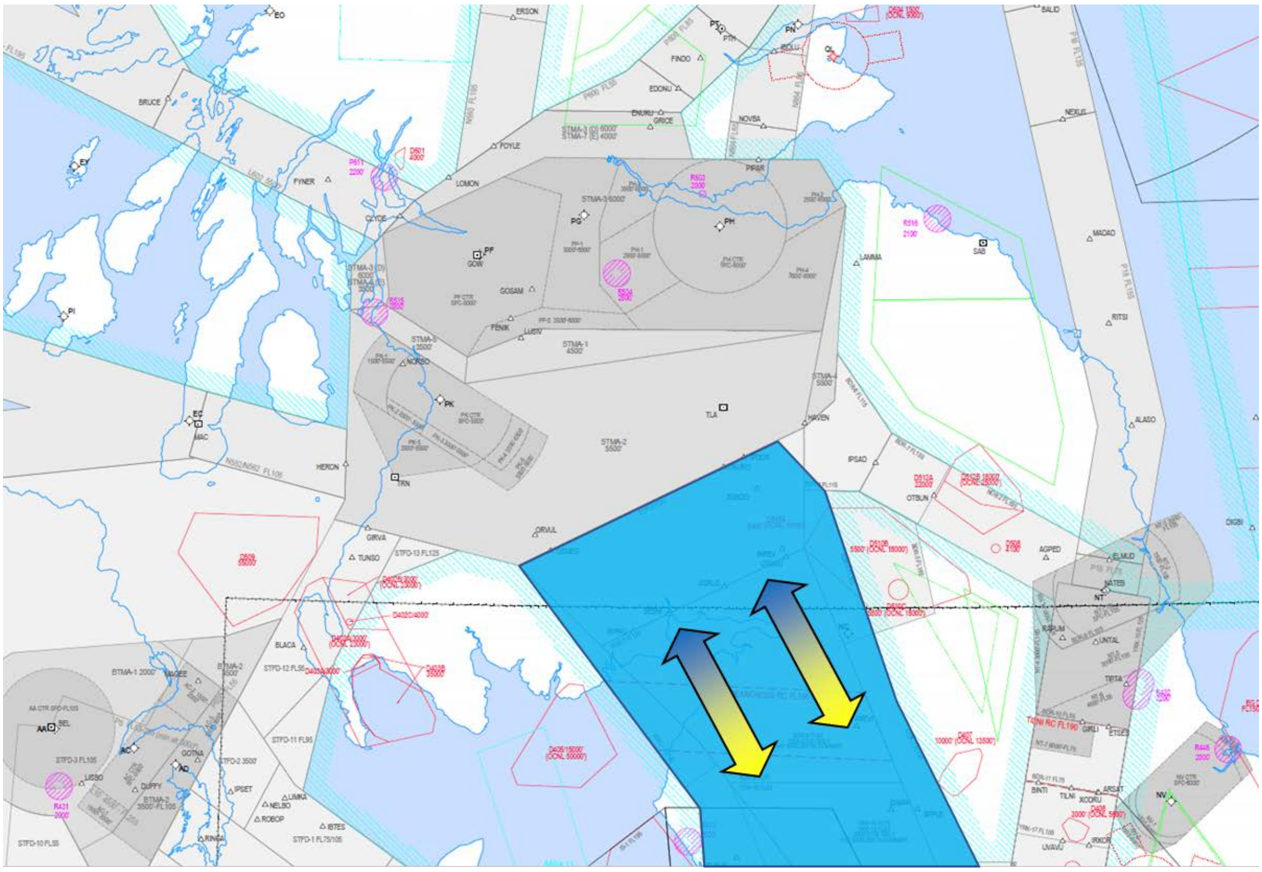

Figure 31: Adapted internal Airspace map showing the Southern Element Concept 1- Bidirectional routes.

5.124 The concept of the southern element Concept 1 is to introduce a series of parallel bidirectional routes subject to spacing requirements for traffic arriving, departing and overflying the ScTMA.

5.125 This Concept would provide more direct routings from the southern UK to the ScTMA and allow operators to flight plan a route more aligned with their destination.

5.126 However, bidirectional routes are not systemised and therefore will introduce conflictions between north and south bound aircraft which will require controller intervention to resolve. The majority of traffic arriving or departing the ScTMA does so through this element and therefore the associated increase in controller workload may reduce safety and capacity in this busy area.

Benefits

- CO_2 and fuel benefit through the provision of more direct routes

Issues

- May lead to a reduction in safety
- Not compatible with southern ATS route network
- Increase in controller workload
- Bidirectional routes require controller intervention to separate arriving and departing aircraft
- Negative impact on CCO and CDO

Conclusion

5.127 Whilst the introduction of parallel bidirectional routes within the southern element offers a Fuel and CO_2 benefit, it does so at the expense of safety and is not compatible with the route network in the south. This Concept would also increase controller workload which further reduces capacity. As such this Concept is not as good as the baseline or one that makes use of systemisation.

5.128 Design Principle Evaluation concluded that:

- 5 design principles were “Met”
- 2 design principles were “Partially Met” (0 High, 2 Med)
- 6 design principles were “Not Met” (5 High, 1 Med).

5.129 Please see Annex D: Design Principle Evaluation for detailed analysis.

5.130 This Concept was **Rejected** for further consideration as it did not meet the progression requirements set for the Design Principle Evaluation.

Concept 2: Bidirectional Routes including a review of CAS bases

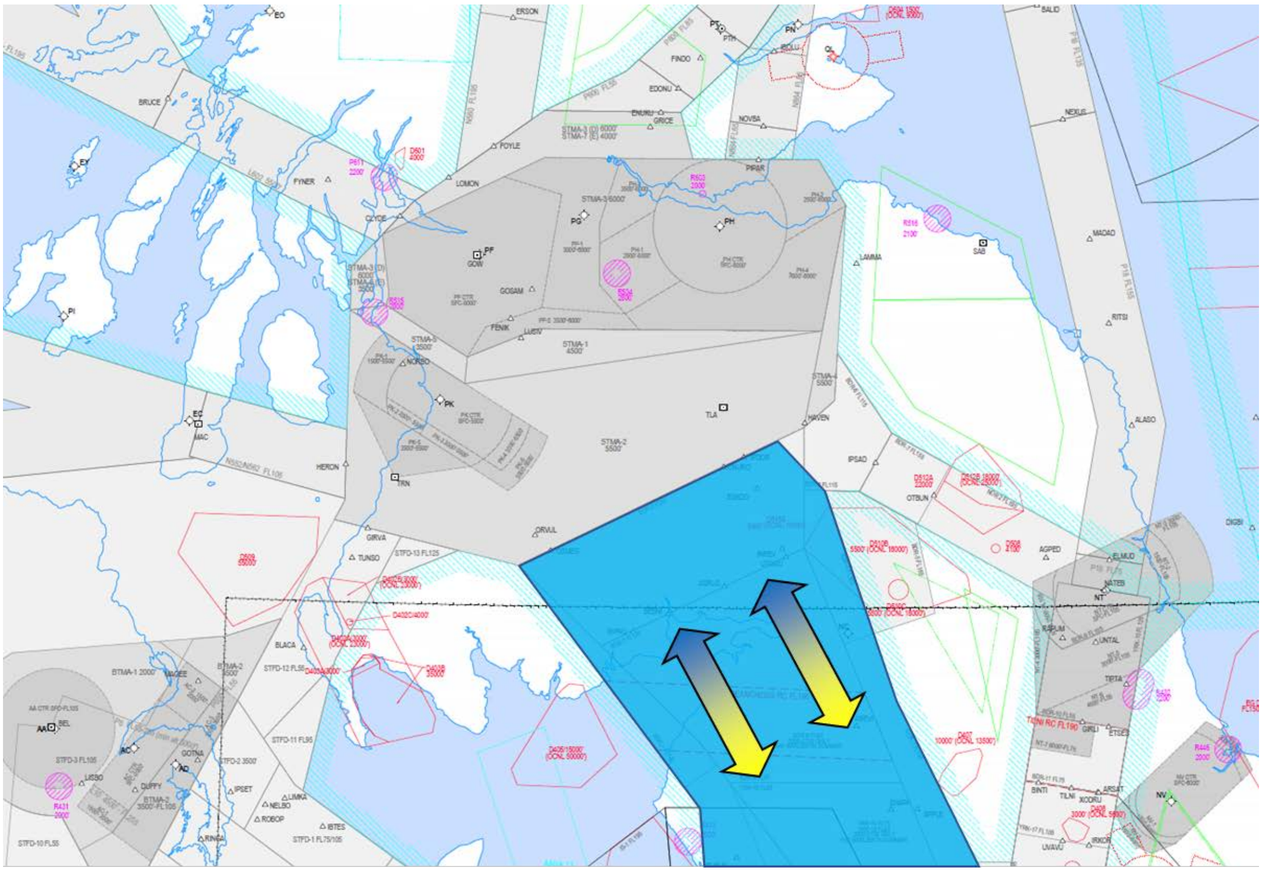

Figure 32: Adapted internal Airspace map showing the Southern Element Concept 2- Bidirectional routes with lowered CAS bases.

5.131 The approach used for Concept 2 is to develop Concept 1 by introducing a series of bidirectional routes and to review the base of CAS within this area.

5.132 As well as allowing more direct routings from the southern UK airspace to the ScTMA allowing operators to flight plan a route more aligned with their destination, this Concept will allow for improved CDO for aircraft arriving at the ScTMA by lowering the Base of CAS where this prohibits CDO and releasing CAS which is no longer required as aircraft have routinely climbed above these levels. However, the benefit to CDO operations is limited by the increased conflictions between arriving and departing aircraft which will negatively impact both CCO and CDO.

5.133 However, this Concept still utilises bidirectional routes which are not systemised. Therefore, this Concept offers limited improvement over Concept 1 and would still introduce conflictions between north and south bound aircraft which will require controller intervention to resolve. Most of the traffic arriving or departing the ScTMA does so through this element and therefore the associated increase in controller workload in this busy area may reduce safety and capacity.

Benefits

- CO_2 and fuel benefit through the provision of more direct routes
- Potential release of CAS
- Improved CDO

Issues

- May lead to a reduction in safety
- Not compatible with southern ATS route network
- Increase in controller workload
- Bidirectional routes require controller intervention to separate arriving and departing aircraft
- Negative impact on CCO

Conclusion

5.134 Whilst the introduction of parallel bidirectional routes within the southern element offers a Fuel and CO_2 benefit, it does so at the expense of safety and is not compatible with the route network in the south. This Concept would also increase controller workload which further reduces capacity. The review of the base of CAS allows for improved CDO and the release of underutilised CAS but does not mitigate against the disbenefit caused by introducing bidirectional routes within this element. As such this Concept is not as good as the baseline or one that makes use of systemisation.

5.135 Design Principle Evaluation concluded that:

- 5 design principles were "Met"
- 2 design principles were "Partially Met" (0 High, 2 Med)
- 6 design principles were "Not Met" (5 High, 1 Med).

5.136 Please see Annex D: Design Principle Evaluation for detailed analysis.

5.137 This Concept was Rejected for further consideration as it did not meet the progression requirements set for the Design Principle Evaluation.

Concept 3: Systemised routes orientated according to traffic flow

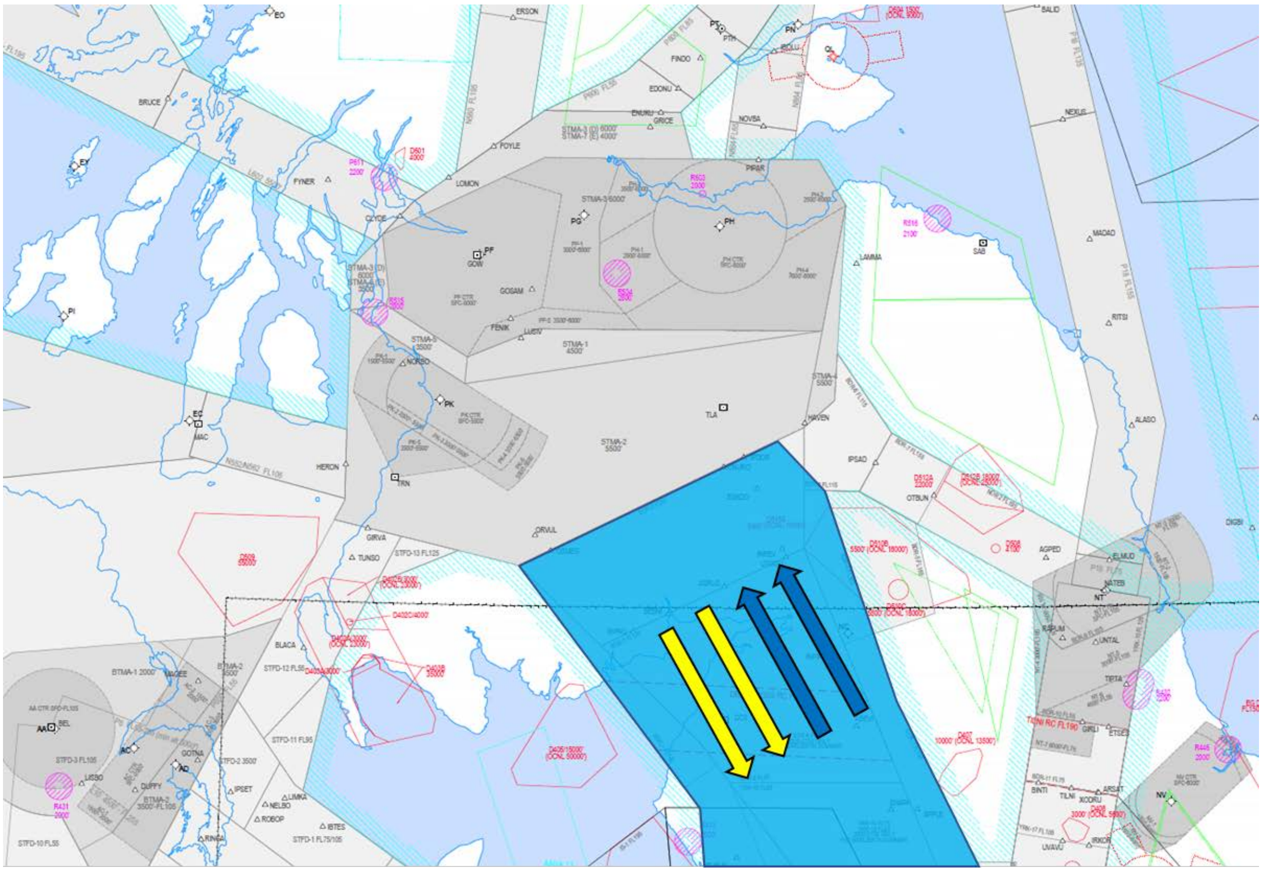

Figure 33: Adapted internal Airspace map showing the Southern Element Concept 3- Systemised routes aligned with existing traffic flow.

5.138 The approach used for Concept 3 is to introduce a parallel systemised route structure (up to 8 tracks depending on route spacing) within the southern element which replicates the existing traffic orientation.

5.139 This Concept will provide economic and environmental benefits by providing more direct routings from the southern UK airspace to the ScTMA. This will allow operators to flight plan a route more aligned with their destination.

5.140 This Concept will not require any additional CAS and therefore should minimise the impact on MoD or GA operations.

5.141 The existing airspace separates arrival and departure traffic flows and therefore this Concept does not provide a benefit to CCO or CDO by removing existing conflicts. By aligning with the existing traffic flows this Concept will remain compatible with the existing route network. However, this Concept could also introduce additional ATS routes enhancing capacity and resilience.

5.142 This Concept offers improvement over the baseline and Concept 1 but does not review the base of CAS which could improve CDO and/or release existing CAS.

Benefits

- CO_2 and fuel benefit through the provision of more direct routes
- Improved Capacity and resilience
- Compatible with southern ATS route network
- Reduction in controller workload

Issues

None anticipated

Conclusion

5.143 The introduction of a parallel systemised route structure with arrivals on one side of the airway and departures on the other within the southern element offers a Fuel and CO_2 benefit to operators and increases network capacity and resilience.

5.144 Design Principle Evaluation concluded that:

- 12 design principles were "Met"
- 1 design principles were "Partially Met" (0 High, 1 Med)
- 0 design principles were "Not Met"

5.145 Please see Annex D: Design Principle Evaluation for detailed analysis.

5.146 This Concept was accepted and progressed for further consideration in the initial options appraisal.

Concept 4: Systemised routes orientated according to traffic flow including a review of CAS bases

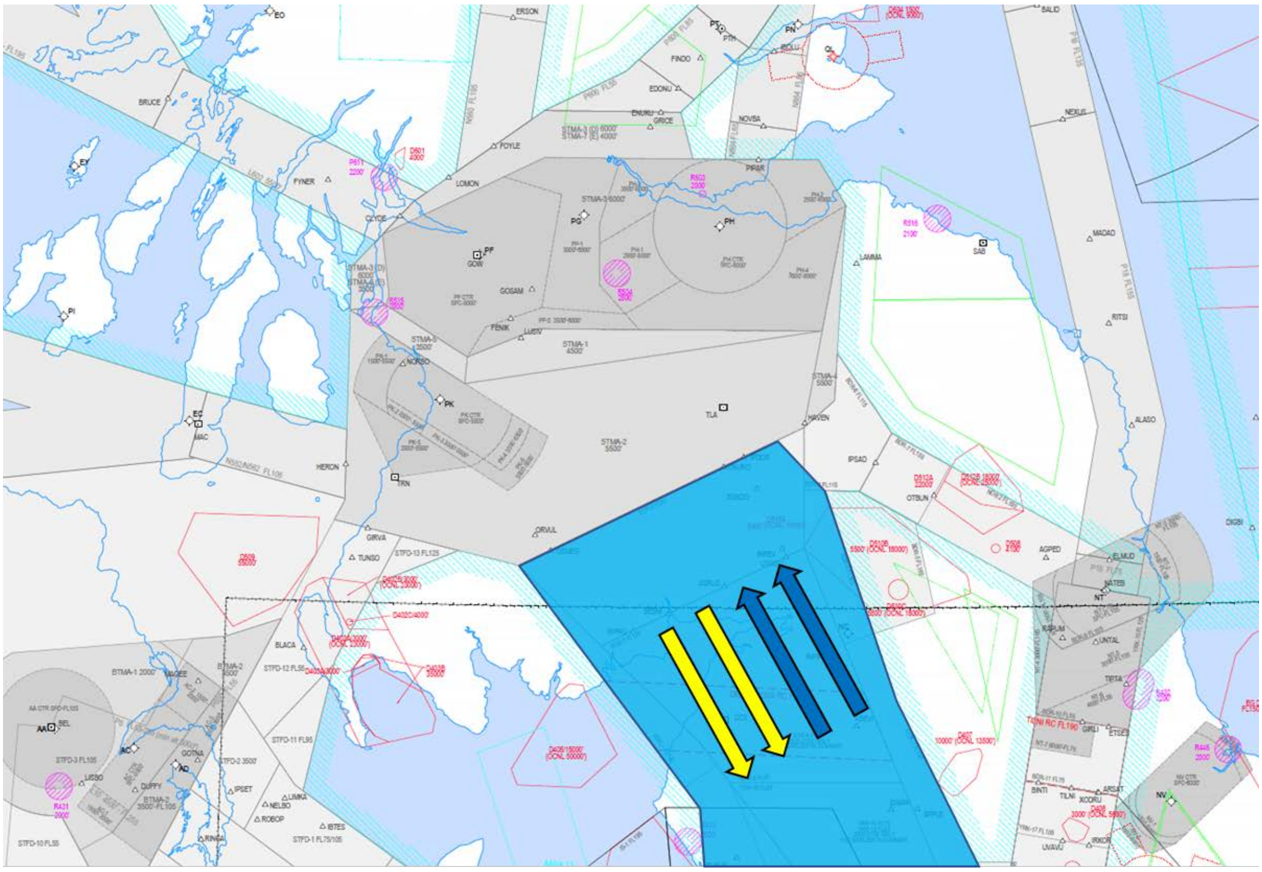

Figure 34: Adapted internal Airspace map showing the Southern Element Concept 4- Systemised routes aligned with existing traffic flows with review of CAS bases.

5.147 The approach used for Concept 4 is to develop Concept 3 by introducing a series of systemised routes (up to 8 depending on route spacing) and to review the bases of CAS within this area.

5.148 As well as allowing more direct routings from the southern UK airspace to the ScTMA allowing operators to flight plan a route more aligned with their destination, this Concept will allow for improved CDO for aircraft arriving at the ScTMA by lowering the Base of CAS where this prohibits CDOs. Additionally, this Concept will allow the release of CAS which is no longer required as aircraft have routinely climbed above these levels.

5.149 This Concept will provide economic and environmental benefits by providing more direct routings from the southern UK airspace to the ScTMA and improving CDO's. This Concept will allow operators to flight plan a route more aligned with their destination.

5.150 By aligning with the existing traffic flows this Concept will remain compatible with the existing route network. However, this Concept could also introduce additional ATS routes enhancing capacity and resilience.

5.151 This Concept offers improvement over Concept 3.

Benefits

- CO_2 and fuel benefit through the provision of more direct routes
- Improved Capacity and resilience
- Compatible with southern ATS route network
- Reduction in controller workload
- Improved CDO
- Potential release of CAS

Issues

- lowering of CAS could impact GA and MoD operations

Conclusion

5.152 The introduction of a parallel systemised route structure with arrivals on one side of the airway and departures on the other within the southern element offers a Fuel and CO_2 benefit to operators and increases network capacity and resilience. Reviewing the base of CAS will facilitate improved CDO and potentially release additional CAS.

5.153 Design Principle Evaluation concluded that:

- 12 design principles were “Met”
- 1 design principles were “Partially Met” (0 High, 1 Med)
- 0 design principles were “Not Met”

5.154 Please see Annex D: Design Principle Evaluation for detailed analysis.

5.155 This Concept was accepted and progressed for further consideration in the initial options appraisal and is NERL preferred solution for the Southern element.

Concept 5: Systemised routes orientated by ScTMA airports

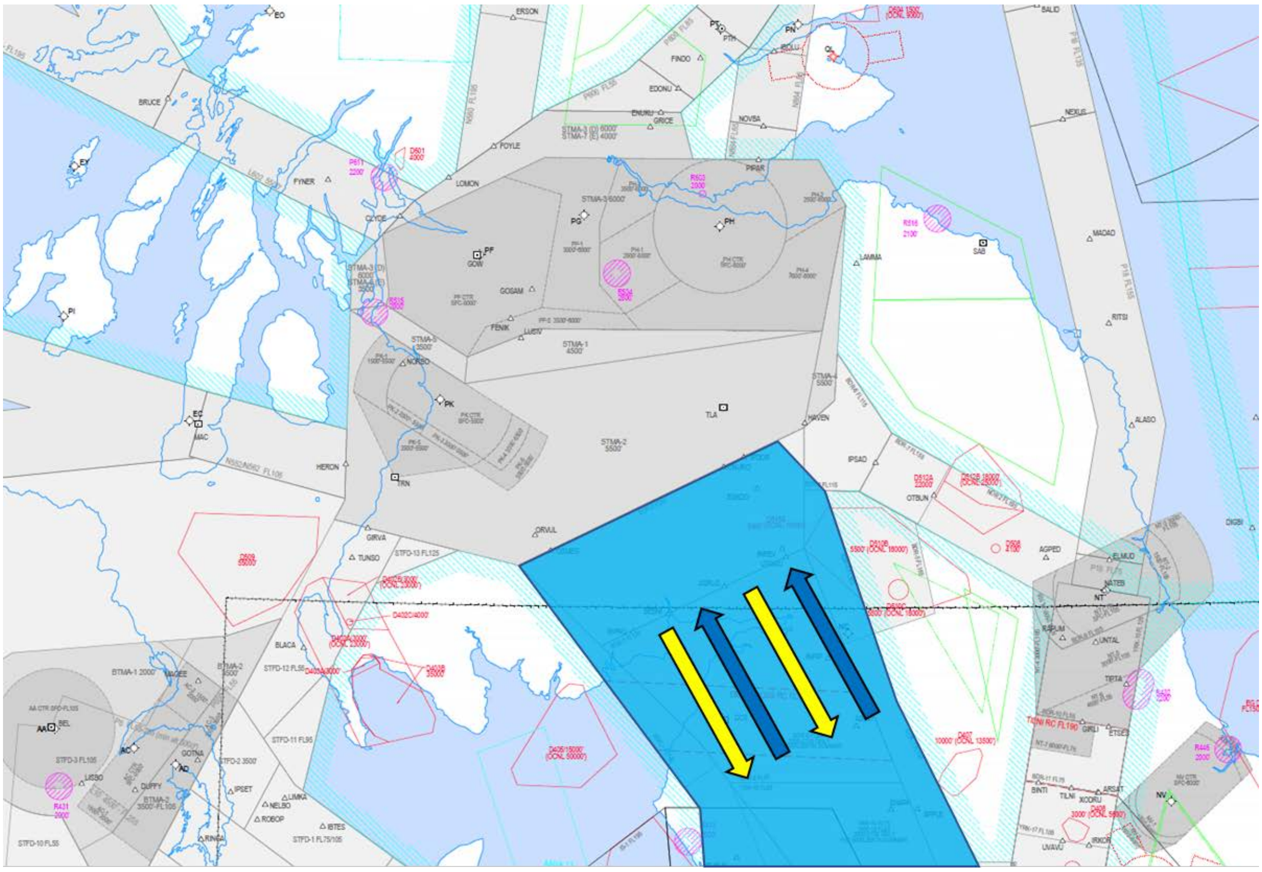

Figure 35: Adapted internal Airspace map showing the Southern Element Concept 5- Systemised routes aligned with ScTMA airports

5.156 The approach used for Concept 5 is to introduce a series (up to 8 depending on route spacing) of alternating North/ South systemised routes within existing CAS which can serve specific airports.

5.157 This Concept will provide economic and environmental benefits by providing more direct routings from the southern UK airspace to the destination ScTMA airfield and allows operators to flight plan a route more aligned with their destination. However, alternating the tracks north/ south requires additional width to accommodate the routes over Concepts 3 or 4 due to ATS route spacing requirements.

5.158 This Concept will be contained within existing CAS and therefore will have minimal impact on MoD or GA operations.

5.159 This Concept does not align with the remaining route network to the south outside the geographical scope of this project which would require the introduction of additional crossing points to provide onward connectivity.

5.160 Whilst the complexity within ScTMA is likely to be reduced, the complexity introduced to the south to connect to the existing network would increase controller workload and reduce the capacity of the airspace outside the geographical scope of this project.

5.161 Resilience is diminished as arrival and departure aircraft are less segregated which will limit any options should there be an unplanned event such as weather avoidance and controllers have to intervene.

Benefits

- CO_2 and fuel benefit through the provision of more direct routes
- Reduced complexity for controllers in ScTMA

Issues

- Reduction in capacity and resilience
- Increase in controller workload(south)
- Incompatible with the Southern ATS route network

Conclusion

5.162 The introduction of a parallel systemised route structure with alternating north/ southbound traffic flows within the southern element offers a Fuel and CO_2 benefit to operators. However, alternating northerly and southerly flows increase controller workload and decrease network capacity and resilience.

5.163 Design Principle Evaluation concluded that:

- 9 design principles were "Met"
- 1 design principles were "Partially Met" (0 High, 1 Med)
- 3 design principles were "Not Met" (3 High, 0 Med)

5.164 Please see Annex D: Design Principle Evaluation for detailed analysis.

5.165 This Concept was **Rejected** for further consideration as it did not meet the progression requirements set for the Design Principle Evaluation.

Concept 6: Systemised routes orientated by ScTMA airports including a review of CAS bases

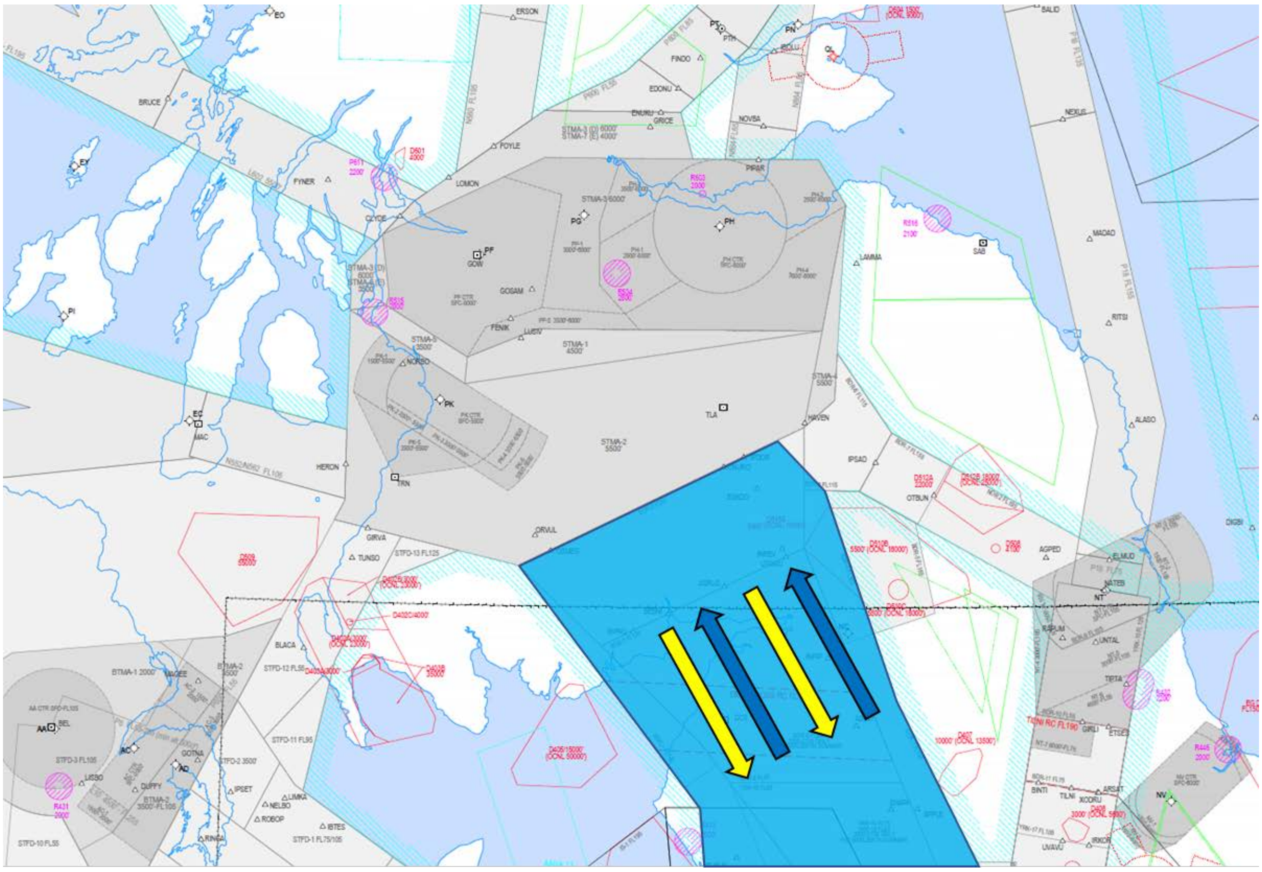

Figure 36 Adapted internal Airspace map showing the Southern Element Concept 6- Systemised routes aligned with ScTMA airports with a review of CAS bases

5.167 The approach used for Concept 5 is to develop Concept 5 by introducing a series of alternating North/ South systemised routes within existing CAS which can serve specific airports and to review the bases of CAS in this area.

5.168 As well as allowing more direct routings from the southern UK airspace to the ScTMA allowing operators to flight plan a route more aligned with their destination, this Concept will allow for improved CDO for aircraft arriving at the ScTMA by lowering the Base of CAS where this prohibits CDOs. Additionally, this Concept will allow the release of CAS which is no longer required as aircraft have routinely climbed above these levels.

5.169 This Concept will be contained within existing CAS and therefore will have minimal impact on MoD or GA operations.

5.170 This Concept does not align with the route network in the south which would require the introduction of additional crossing points to provide onward connectivity.

5.171 The complexity introduced in the south to connect to the existing network would increase controller workload and reduce the capacity of the airspace.

5.172 Resilience is diminished as arrival and departure aircraft are less segregated which will limit any options should there be an unplanned event such as weather avoidance and controllers have to intervene.

Benefits

- CO_2 and fuel benefit through the provision of more direct routes
- Improved CDO's by lowering CAS where this prohibits continued descent
- CAS released where it is not utilised
- Reduced complexity within ScTMA

Issues

- Reduction in capacity and resilience to adjacent sectors
- Increase in controller workload to adjacent sectors
- Incompatible with the Southern ATS route network

Conclusion

5.173 The introduction of a parallel systemised route structure with alternating north/ southbound traffic flows within the southern element offers a Fuel and CO_2 benefit to operators. However, alternating northerly and southerly flows increase controller workload and decrease network capacity and resilience. Reviewing the base of CAS will facilitate improved CDO and potentially release additional CAS.

5.174 Design Principle Evaluation concluded that:

- 8 design principles were "Met"
- 2 design principles were "Partially Met" (0 High, 2 Med)
- 3 design principles were "Not Met" (3 High, 0 Med)

5.175 Please see Annex D: Design Principle Evaluation for detailed analysis.

5.176 This Concept was **Rejected** for further consideration as it did not meet the progression requirements set for the Design Principle Evaluation.

South-western Element

The South-Western element seeks review and improve the existing ATS route structure surrounding P600.

Concept 0: Baseline

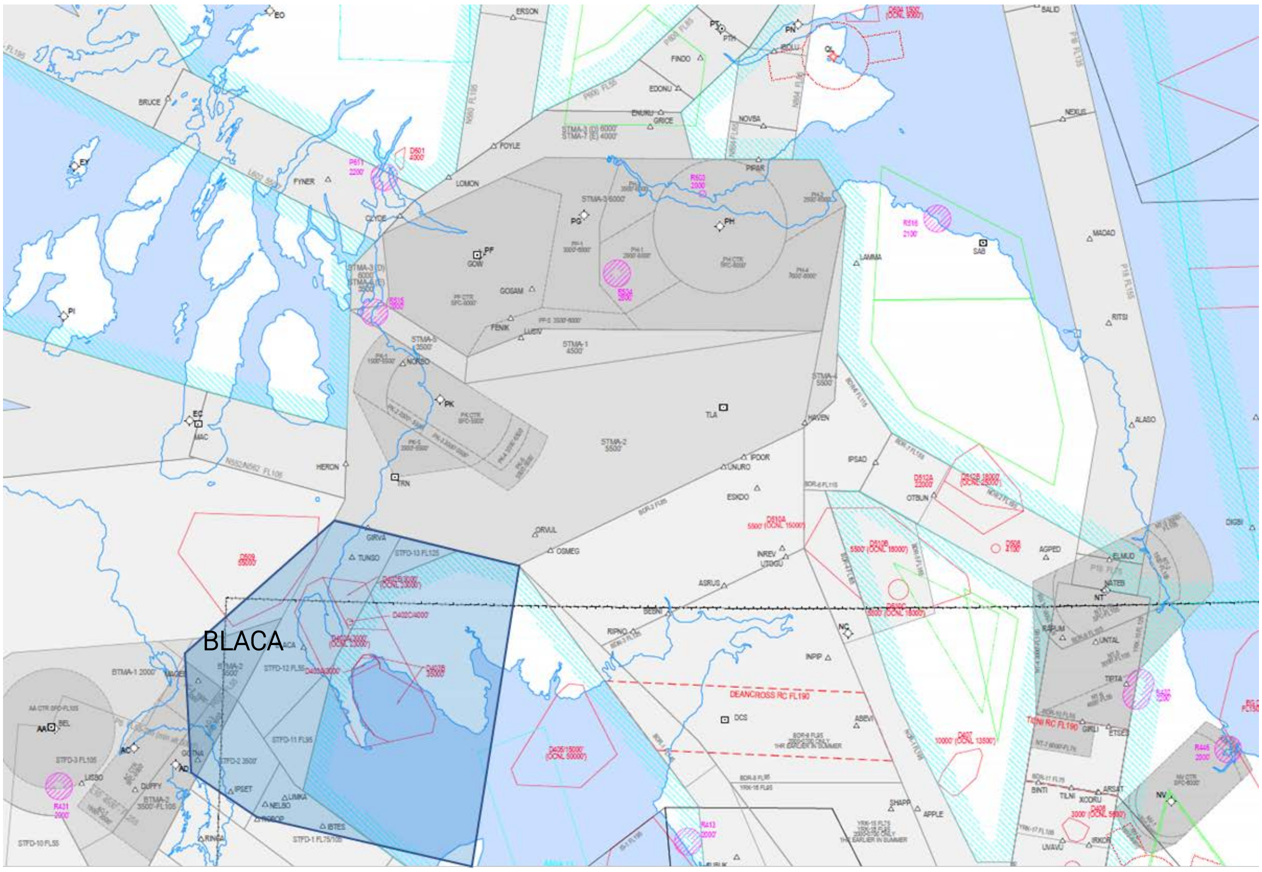

Figure 37: Adapted internal Airspace map showing the lateral limits of the South-Western Element and surrounding airspace.

5.177 A 'Do-Nothing' option representing the current day operation must be included and is used as the baseline against which all other Concepts are compared.

5.178 The South-Western element accommodates traffic arriving and departing the ScTMA from Ireland, the Iberian Peninsula, the Canaries and Africa. via the existing Bidirectional airway, P600.

5.179 At BLACA, where P600 crosses the Scottish coastline, P600 splits into a systemised structure consisting of northbound traffic on P600 and southbound traffic on P620 to the Scottish, Ireland FIR boundary.

5.180 SME feedback has not identified any benefit to amending the bases and as such these are not likely to be changed from the extant. However, should later design work identify any benefit to amending these bases NERL reserves the right to consider these.

5.181 P600 passes between two danger areas, Danger area 509 (Campbeltown) to the west and 403B (Luce Bay) to the east. This airway also passes over the D402 complex (Luce Bay) however this complex only occasionally impacts the airway. These Danger areas will be considered in any proposed design.

5.182 The 'Do-Nothing Concept is Rejected since it would bring no benefit and did not meet the progression requirements set for the Design Principle Evaluation.

Stakeholder feedback relevant to design element

5.183 The feedback received in relation to this design element did not influence the development of the element concepts.

Concept 1: Systemised Routes

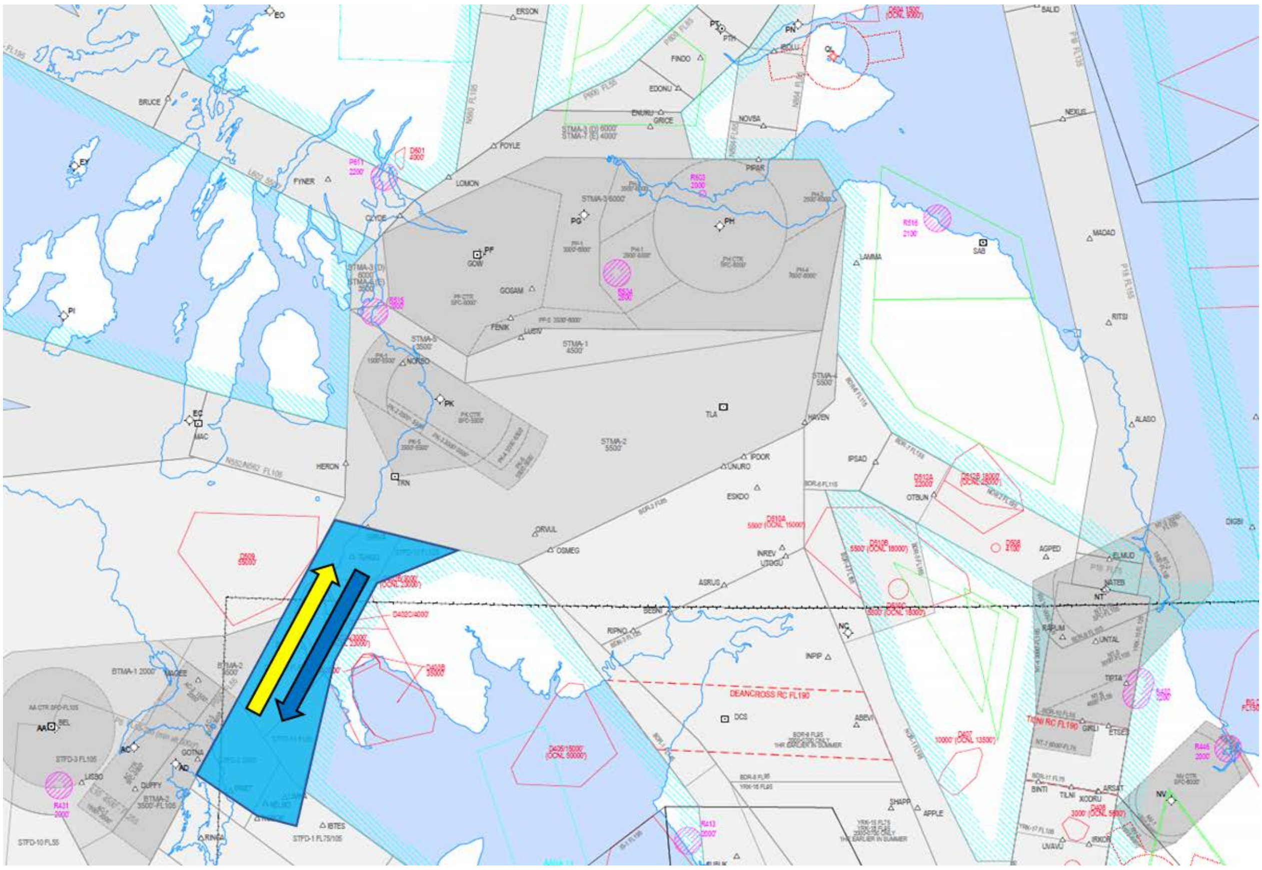

Figure 38: Adapted internal Airspace map showing the South-Western element Concept 1- Systemised routes

5.184 The approach used for Concept 1 is to extend the P600/ P620 systemised route structure into the ScTMA.

5.185 The extension of this structure will provide a safety, capacity and resilience benefit by deconflicting aircraft arriving and departing the ScTMA to/from Ireland, the Iberian Peninsula, the Canaries and Africa subsequently reducing controller workload.

5.186 This Concept may require a small quantity of additional CAS to facilitate the introduction of two, opposite direction routes. This additional CAS will be the minimum required to comply with the route spacing requirements and will only have minimal impact upon GA and MoD operations.

5.187 The reduction in conflictions should lead to a slight economic and environmental benefit as aircraft are less likely to be vectored away from their flight planned routes. Departing aircraft are deconflicted from arrival aircraft so are able to climb more efficiently improving CCO. Aircraft inbound to the ScTMA can be kept higher for longer improving CDO.

Benefits

- Increase in safety through the planned deconfliction of arriving and departing aircraft
- CO_2 and fuel benefit through improved adherence with the flight planned route
- Improved CCO and CDO
- Capacity and resilience increase by reducing controller workload by removing conflictions between arriving and departing aircraft

Issues

- Additional CAS may be required.

Conclusion

5.188 The introduction of a systemised airspace structure in the South-Western element offers an increase in safety as well as providing benefits in capacity, resilience, economic and environmental benefit. However, the cost of this benefit is the potential requirement to widen the airway to facilitate the introduction of these routes, potentially impacting the MoD and GA.

5.189 Design Principle Evaluation concluded that:

- 10 design principles were "Met"
- 3 design principles were "Partially Met" (0 High, 3 Med)
- 0 design principles were "Not Met" (0 High, 0 Med).

5.190 Please see Annex D: Design Principle Evaluation for detailed analysis.

5.191 This Concept was accepted and progressed for further consideration in the initial options appraisal and is NERL preferred solution for the South-Western element.

Northern Element

The Northern element seeks review and improve the existing ATS route structure surrounding N562, L602, N560, P600 and N864.

Concept 0: Baseline

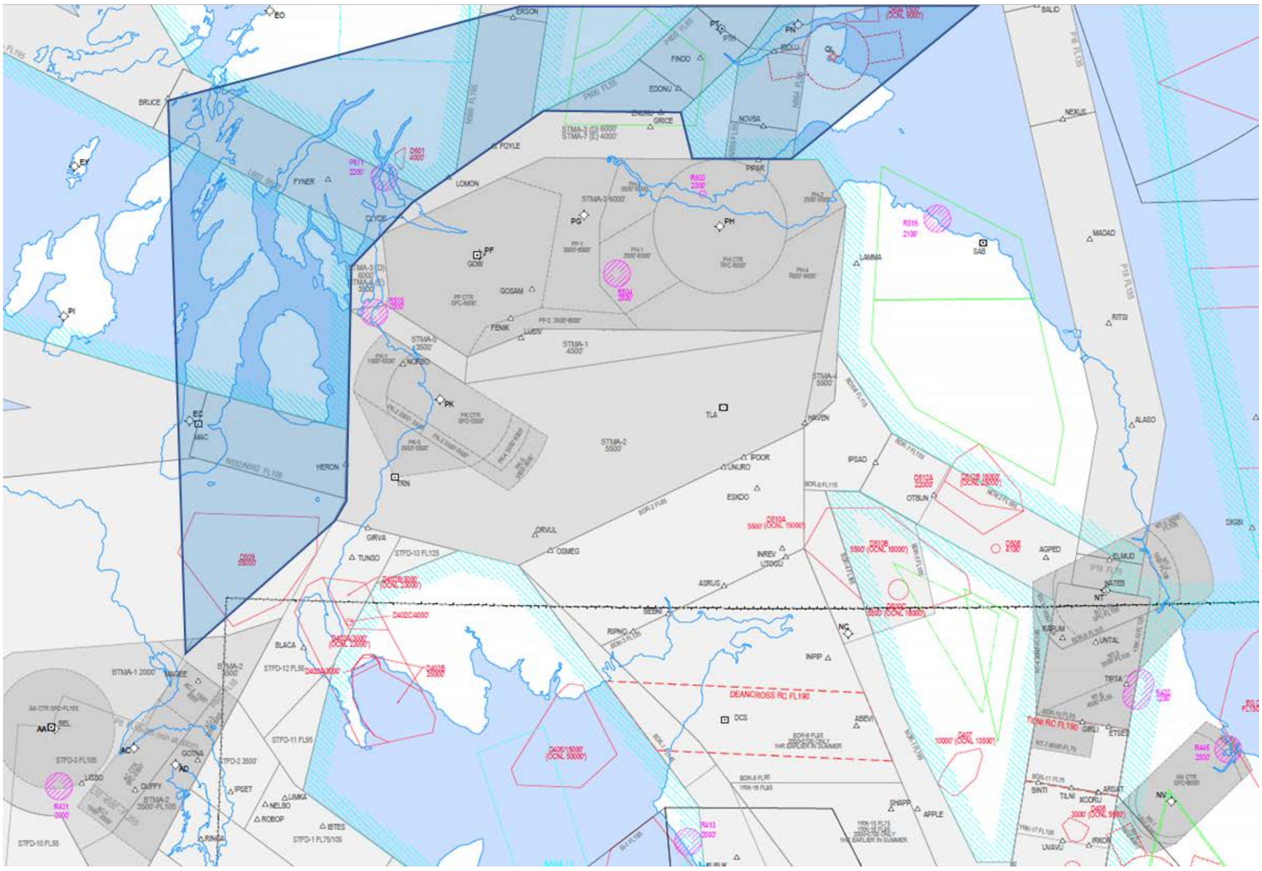

Figure 39: Adapted internal Airspace map showing the lateral limits of the Northern Element and surrounding airspace.

5.192 A 'Do-Nothing' option representing the current day operation must be included and is used as the baseline against which all other Concepts are compared.

5.193 The Northern element accommodates traffic arriving and departing the ScTMA from the transatlantic tracks, the Outer Hebrides, Wick, Sumbrough, Inverness, the Orkneys, Reykjavik, Perth, Aberdeen, the Shetlands and Northern Scandinavia via the bidirectional ATS routes N562, L602, N560, P600 and N864.

5.194 SME feedback has identified that whilst there is no economic or environmental benefit to amending the bases of CAS, there could be resilience, capacity and safety benefits.

5.195 To the south of N562 is Danger area 509 (Campbeltown) This Danger area is considered fixed and therefore access and dimensions cannot be amended.

5.196 ATS routes L602 and N560 are surrounded by TRA008C. P600 passes through TRAG Portmoak and N864 is restricted by TRA007A. Therefore, any requirement to widen or amend these CTA's will require continued military engagement.

5.197 Between P600 and N864 is used by Strathallan for parachute activities restricting this airspace

5.198 The 'Do-Nothing' option is **Rejected** since it would bring no benefit and did not meet the progression requirements set for the Design Principle Evaluation.

Stakeholder feedback relevant to design element

Stakeholder	Feedback	Impact
BGA	Can P600 be redesignated Class A to Class D	Airspace classification will be considered later in the process

Table 19: Stakeholder feedback received pertinent to the Northern element

Concept 1: Bi-directional route structure and review bases

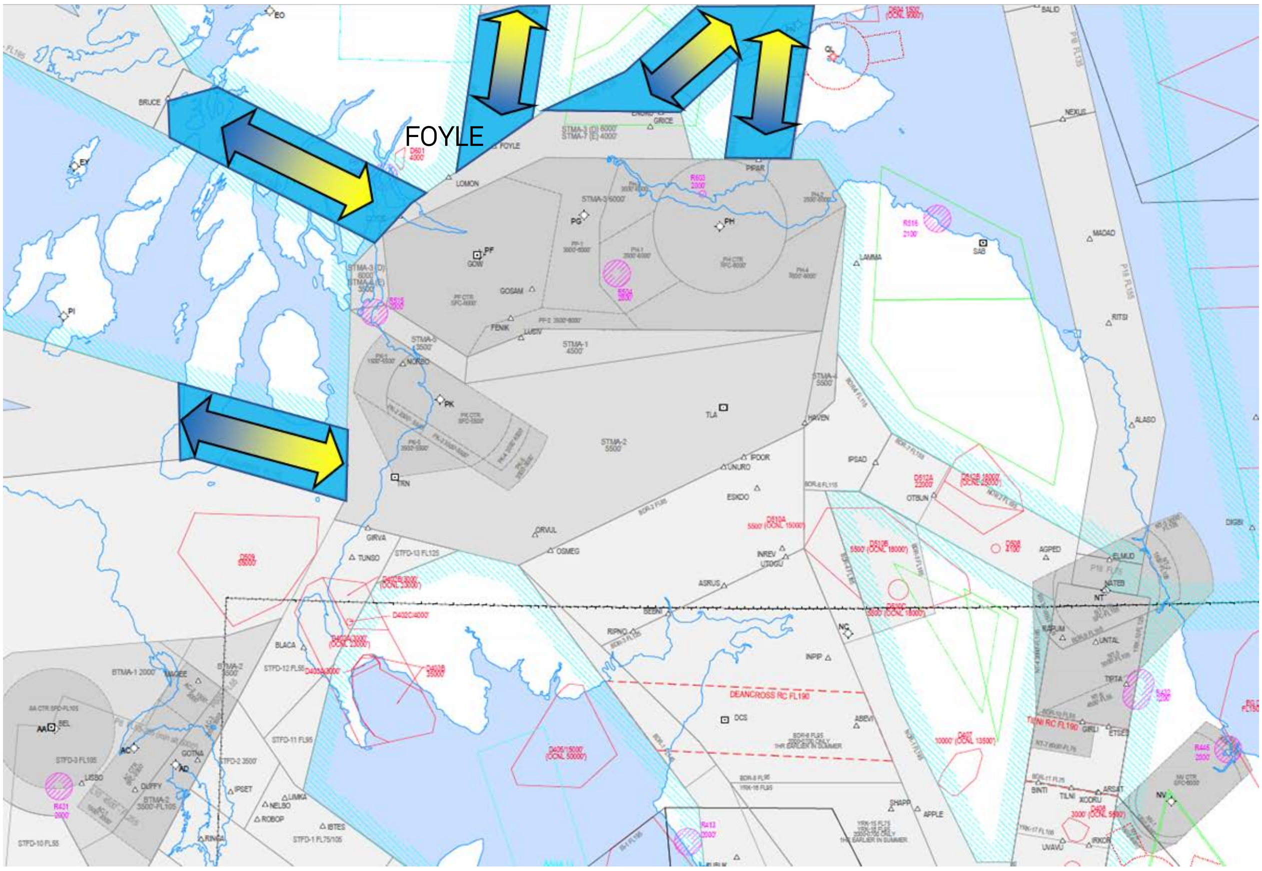

Figure 40: Adapted internal Airspace map showing the Northern Element Concept 1- Bidirectional routes with a review of CAS bases.

5.199 The concept of the Northern element Concept 1 is to maintain the existing bidirectional route structure and connectivity but review the bases of CAS of these routes. The base of CAS may be lowered or raised depending on demand.

5.200 SME input has identified that there is no economic or environmental benefit to amending the bases of CAS as there would be no benefit to arriving and/or departing aircraft. However, there could be resilience capacity and safety benefits through a reduction in controller workload.

5.201 The existing FOYLE hold currently is not fully contained within existing CAS. Lowering the base of CAS in this area will allow the FOYLE hold to be fully contained within CAS. This will reduce a controller’s workload and increase safety when holding aircraft at FOYLE.

5.202 This concept will allow the release of CAS which is no longer required as aircraft have routinely climbed above these levels. It is anticipated that there will be a net reduction of CAS in the Northern element benefiting GA and MoD airspace users.

5.203 This option does not separate north and southbound aircraft; however the current and anticipated use of these routes suggest that the benefit of systemising does not offset the potential requirement for additional airspace or additional route designators and 5LNCs required for any new routes.

Benefits

- Increase in safety
- Reduction in controller workload
- Net reduction in CAS volume

Issues

- Bidirectional routes require controller intervention to separate arriving and departing aircraft

Conclusion

5.204 This option maintains the existing bidirectional route structure and reviews the base of CAS along these CTA's. Forecast traffic demands on this airspace suggest that there is no benefit to introducing a systemised airspace structure within this element. SME input has indicated there are no benefits to CDO by lowering airspace although there is a potential to improve safety, capacity and resilience by reducing controller workload. The release of superfluous CAS enabled by this option should result in a net reduction in CAS volume.

5.205 Design Principle Evaluation concluded that:

- 9 design principles were "Met"
- 4 design principles were "Partially Met" (1 High, 3 Med)
- 0 design principles were "Not Met" (0 High, 0 Med).

5.206 Please see Annex D: Design Principle Evaluation for detailed analysis.

5.207 This Concept was accepted and progressed for further consideration in the initial options appraisal and is NERL preferred solution for the Northern element.

Concept 2: Systemised route structure

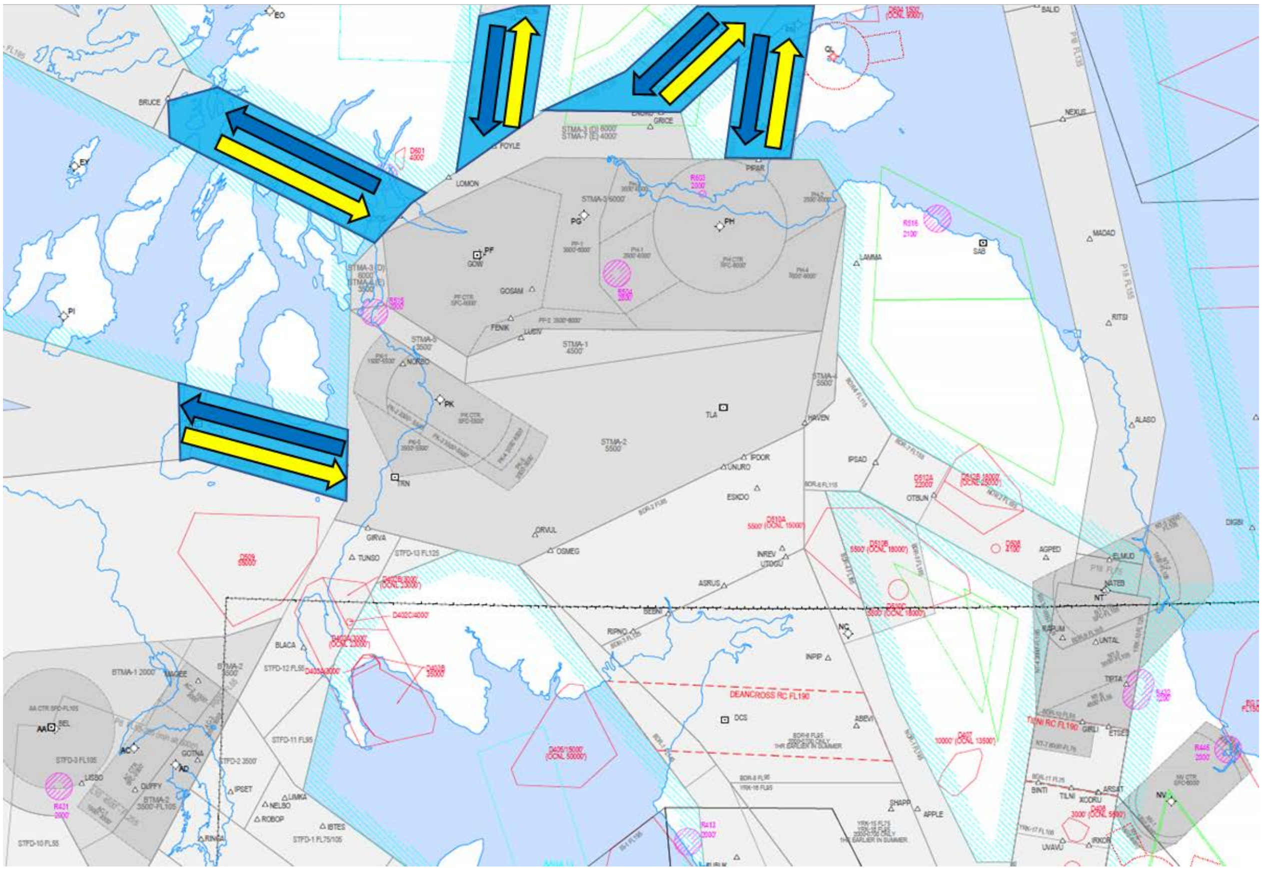

Figure 41: Adapted internal Airspace map showing the Northern Element Concept 2- Systemised routes.

5.208 The approach used for the Northern element Concept 2 is to introduce a systemised route structure to provide the existing connectivity.

5.209 SME input has identified that there is insufficient demand to justify the introduction of a systemised route structure in place of the extant bidirectional routes. However, this option was still considered in the DP evaluation to demonstrate why a systemised structure is not suitable.

5.210 A systemised structure could be implemented safely and would prevent conflictions occurring. However, these conflictions do not currently cause a workload or capacity issue and are not foreseen to become an issue with the anticipated use. The current low and forecast utilisation of these routes suggest that any capacity benefit introduced through this change will not be realised.

5.211 The introduction of a systemised route structure will increase track mileage as aircraft will first diverge into the systemised structure and will then converge as they leave it to re-join the neighbouring ATS route structure. This will lead to a fuel and CO_2 disbenefit.

5.212 Additionally, a systemised route structure may require new CAS to accommodate a second route subject to route spacing requirements. This additional CAS may impact MoD and GA operations for limited benefit to the airspace and its users.

Benefits

- Marginal increase in safety

Issues

- Increase track milage leading to increase fuel burn and CO_2 emissions
- Additional CAS may impact GA and MoD operations

Conclusion

5.213 This option introduces a systemised route structure. Forecast traffic demands on this airspace suggest that this offers limited benefit. A systemised airspace will increase track mileage and may require additional CAS impact MoD and GA operations.

5.214 Design Principle Evaluation concluded that:

- 5 design principles were "Met"
- 6 design principles were "Partially Met" (2 High, 4 Med)
- 2 design principles were "Not Met" (0 High, 2 Med).

5.215 Please see Annex D: Design Principle Evaluation for detailed analysis.

5.216 This Concept was Rejected for further consideration as it did not meet the progression requirements set for the Design Principle Evaluation.

Concept 3: Systemised route structure and review bases

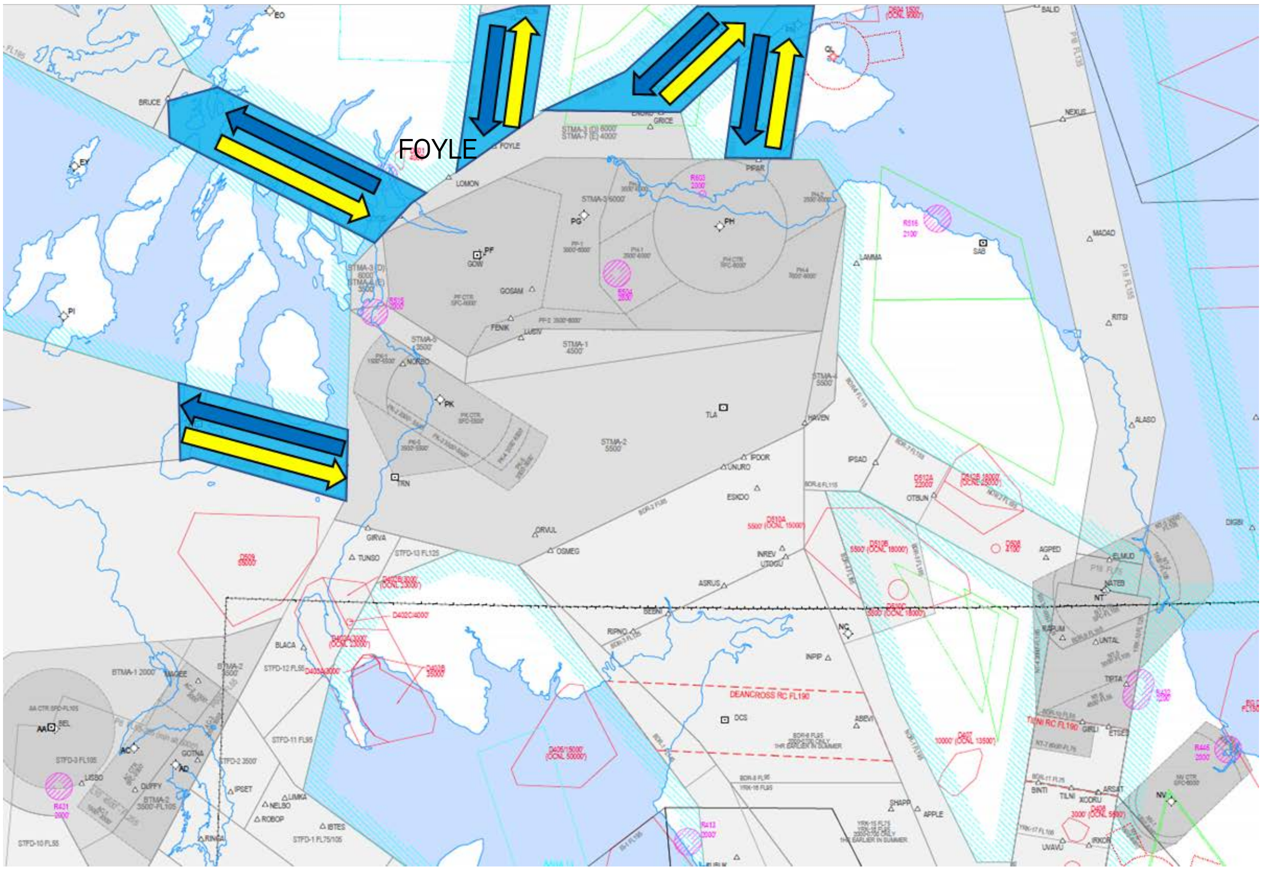

Figure 42: Adapted internal Airspace map showing the Northern Element Concept 3- Systemised routes with a review of CAS bases.

5.217 The approach of used for the Northern element Concept 2 is to introduce a systemised route structure to provide the existing connectivity and review the bases of CAS of these routes. The base of CAS may be lowered or raised depending on demand.

5.218 SME input has identified that there is insufficient demand to justify the introduction of a systemised route structure in place of the extant bidirectional routes. However, this option was still considered in the DP evaluation to demonstrate why a systemised structure is not suitable.

5.219 This option could be implemented safely and would prevent potential conflictions occurring. These conflictions do not currently cause a workload or capacity issue and are not foreseen to become an issue with the anticipated use. The current low and forecast utilisation of these routes suggest that any capacity benefit introduced through this change by systemisation and reviewing the base of CAS will not be realised.

5.220 Furthermore, this input identified that there is no economic or environmental benefit to amending the base of CAS as this would lead to no benefit for arriving and/or departing aircraft. However, there could be resilience capacity and safety benefits through a reduction in controller workload.

5.221 The existing FOYLE hold currently is not fully contained within existing CAS. Lowering the base of CAS in this area will allow the FOYLE hold to be fully contained within CAS. This will reduce controller workload and increase safety when holding aircraft at FOYLE.

5.222 The introduction of a systemised route structure will increase track mileage as aircraft will first diverge into the systemised structure and will then converge as they leave it to re-join the neighbouring ATS route structure. This will lead to a fuel and CO_2 disbenefit.

5.223 Additionally, a systemised route structure may require new CAS to accommodate a second route subject to route spacing requirements. This additional CAS may impact MoD and GA operations for limited benefit to the airspace and its users. It is anticipated that any additional CAS volume required to widen the airway will exceed the volume of superfluous CAS which may be released resulting in a net increase in CAS volume.

5.224 SME input has indicated there are no benefits to CDO by lowering airspace although there is a potential to improve safety, capacity and resilience by reducing controller workload.

Benefits

- Marginal increase in safety
- Increase in resilience
- Reduction in controller workload

Issues

- Increase track milage leading to increase fuel burn and CO_2 emissions
- Additional CAS may impact GA and MoD operations
- Net increase in CAS volume

Conclusion

5.225 This option introduces a systemised route structure. Forecast traffic demands on this airspace suggest that this offers limited benefit. A systemised airspace within this element will increase track mileage and may require additional CAS impact MoD and GA operations. A review of CAS bases may enable improved CDO operations or release superfluous CAS.

5.226 Design Principle Evaluation concluded that:

- 5 design principles were “Met”
- 5 design principles were “Partially Met” (1 High, 4 Med)
- 2 design principles were “Not Met” (0 High, 2 Med).

5.227 Please see Annex D: Design Principle Evaluation for detailed analysis.

5.228 This Concept was **Rejected** for further consideration as it did not meet the progression requirements set for the Design Principle Evaluation.

Central Element

The central element for ATS rote connectivity seeks to ensure existing overflight connectivity between the surrounding elements is maintained.

Concept 0: Baseline

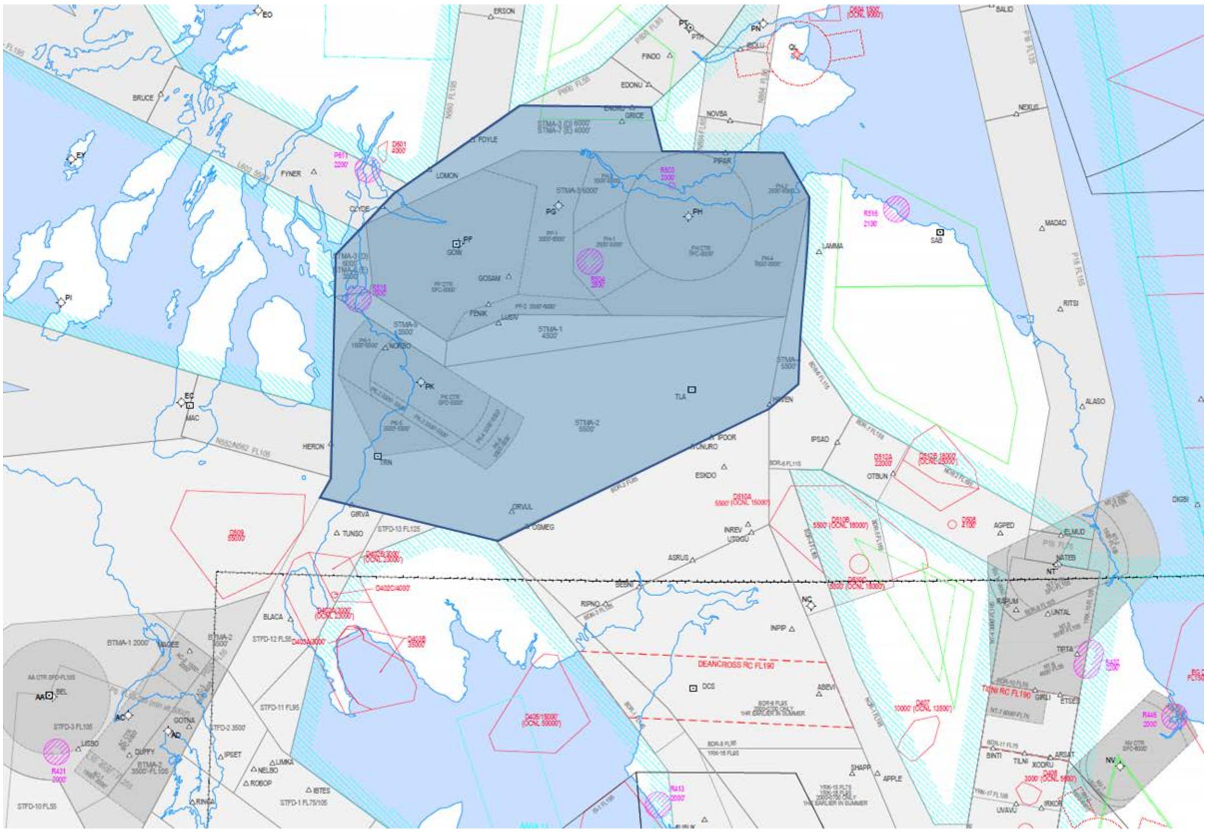

Figure 43: Adapted internal Airspace map showing the lateral limits of the Central Element and surrounding airspace.

5.229 A ‘Do-Nothing’ option representing the current day operation must be included and is used as the baseline against which all other Concepts are compared.

5.230 The central element encompasses the ScTMA airspace and is used by aircraft overflying the ScTMA as well as providing a ATS route network for airport SIDs to connect to. (SID connectivity will be addressed in a later element. STARs typically commence further from the airfields and will be addressed in a later element.)

5.231 Within the ScTMA the base of CAS starts below 7,000 ft and is used by aircraft arriving and departing the ScTMA airfields.

5.232 The extant ATS route structure within the central element provides connectivity between the elements via the extant NavAids. The location of these NavAids is such that the connectivity between the elements is not direct.

5.233 The ‘Do-Nothing’ option is **Rejected** since it would bring no benefit and did not meet the progression requirements set for the Design Principle Evaluation.

Stakeholder feedback relevant to design element

5.234 The feedback received in relation to this design element did not influence the development of the element concepts.

Concept 1: Provide ATS route connectivity to/between surrounding elements within existing CAS

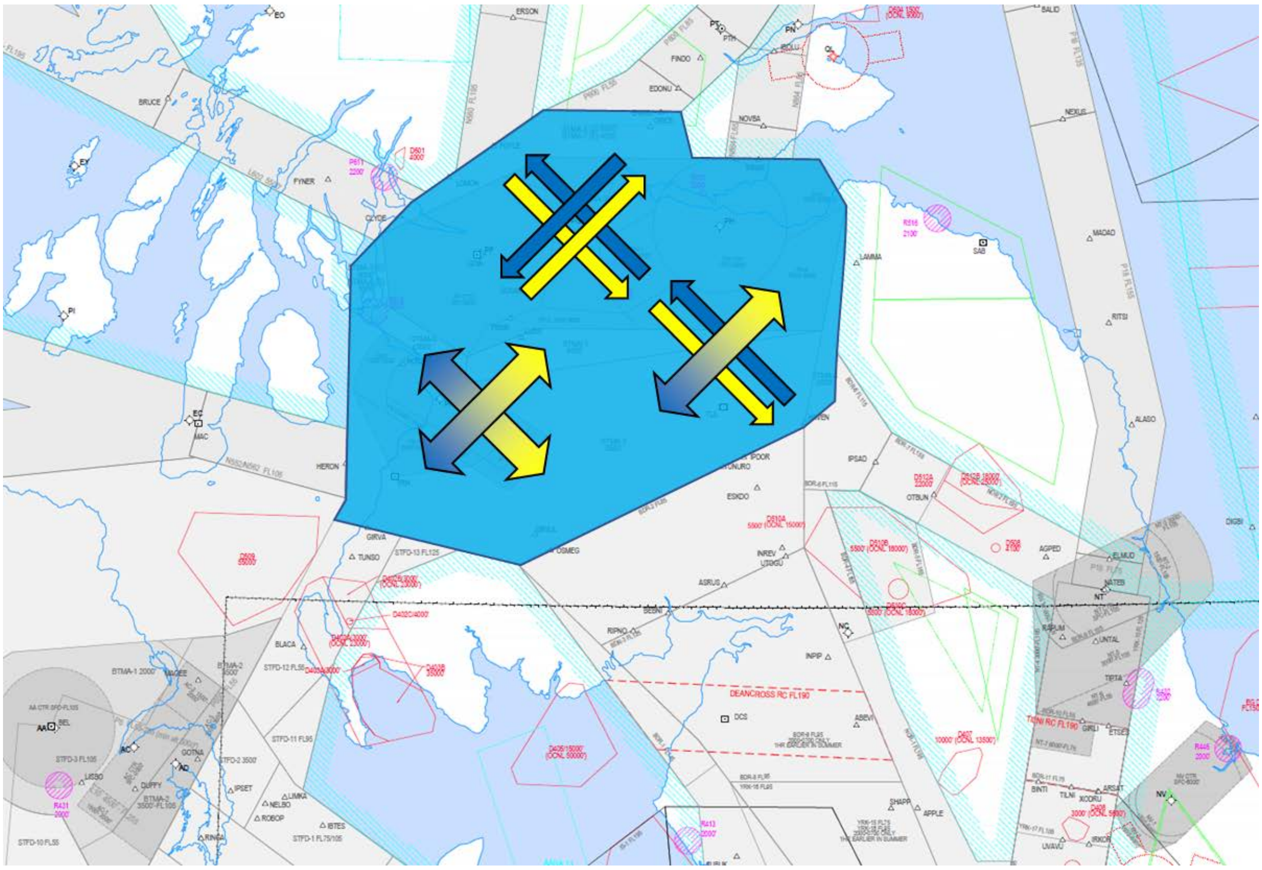

Figure 44: Adapted internal Airspace map showing the Central Element Concept 1- ATS routes connectivity between the surrounding elements.

5.235 The approach used for Central element Concept 1 is to provide connectivity replicating the existing flight plan options between the surrounding concepts.

5.236 This concept will introduce more direct routes, removing the requirement to route via existing NavAids as modern PBN equipage no longer requires this which will reduce track mileage and offer a reduction in fuel burn and CO_2 emissions.

5.237 Removing the requirement to route via NavAids will reduce aircraft convergence, simplifying the operation by reducing the complexity of any conflictions.

5.238 Depending on the finalised options for the surrounding elements, this option may provide connectivity between the different elements.

5.239 There are no airspace considerations within the central element above FL70.

5.240 This option will remain within the existing CAS so will have minimal impact on MoD or GA operations.

Benefits

- Increase in safety through simplified deconflictions
- CO_2 and fuel benefit through more direct routes
- Capacity and resilience increase by improved connectivity between the elements reducing controller workload

Issues

- None identified.

Conclusion

5.241 The introduction of ATS routes providing connectivity between the surrounding elements provides an increase in resilience and capacity whilst reducing controller workload, fuel burn and CO_2 emissions. This option will be contained within existing CAS and therefore will have a minimal impact on GA or MoD operations.

5.242 Design Principle Evaluation concluded that:

- 12 design principles were "Met"
- 1 design principles were "Partially Met" (0 High, 1 Med)
- 0 design principles were "Not Met" (0 High, 0 Med).

5.243 Please see Annex D: Design Principle Evaluation for detailed analysis.

5.244 This Concept was accepted and progressed for further consideration in the initial options appraisal and is NERL preferred solution for the Central element.

6. Airport Arrival and Departure Concepts

6.1 The following pages describe the options available to NERL for providing connectivity between the airport procedures and the ATS route network above 7,000 ft. These options are dependent on the finalised ATS route network design and the low-level ACP changes being made by the airports. NERL are continually engaging with the airports so that both parties understand the other parties' requirements as their respective design options develop. In the Stage 3 submission, NERL and the airports will provide options for consultation which provide seamless connectivity between the proposed Airports and NERL designs. However, at stage 2 it is not possible to provide more than a high-level "connectivity will be provided by…" statement.

Departure Connectivity

The departure connectivity element seeks to provide connectivity between ScTMA SIDs and the UK ATS route network.

Concept 0: Baseline

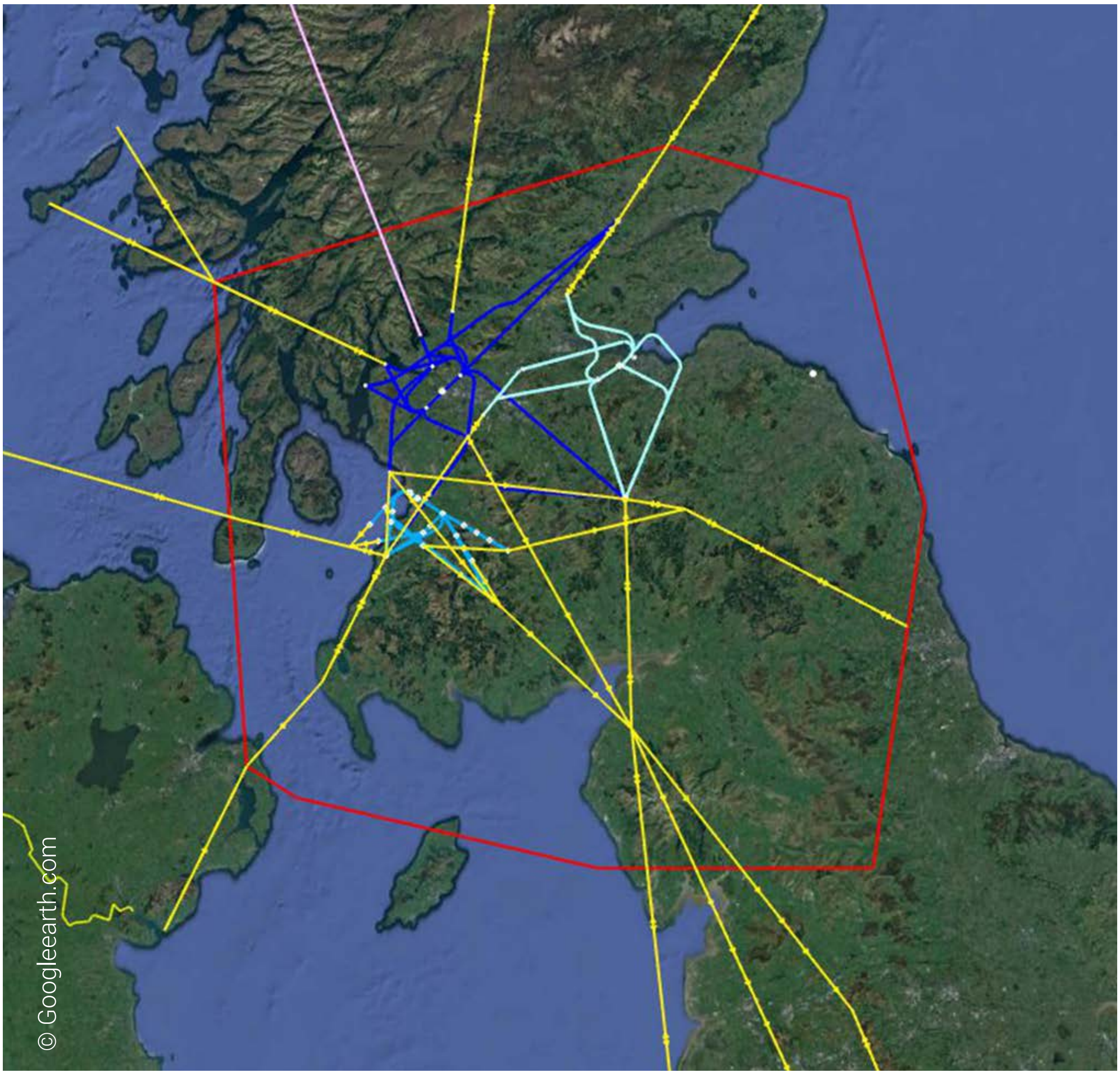

Figure 45: Existing ScTMA airport SIDs (light blue- Edinburgh, mid-blue- Prestwick and dark blue-Glasgow) and their route connectivity (Yellow-ATS routes, Pink- DCT route).

6.2 A 'Do-Nothing' option representing the current day operation must be included and is used as the baseline against which all other Concepts are compared.

6.3 The three main ScTMA airports; Edinburgh, Glasgow and Prestwick all operate using SIDs (Figure 45). A SID is a published procedure which aircraft follow when departing an airfield.

6.4 At the end of a SID aircraft either join the existing route network (SID finishes at a published waypoint on the route), join link route to connect to the route network, continue their flight planned route via a flight plannable DCT or leave CAS.

6.5 The other airfields contained within the ScTMA have departure procedures published within the relevant aerodrome section of the UK AIP (AD2.22).

6.6 Edinburgh and Glasgow airports are pursuing their own ACPs, aligned with this submission, to update their low-level procedures. These changes are being undertaken in close collaboration with each other and NERL to ensure the airspace remains fully compatible. Until the airport departure options are finalised NERL are unable to determine if the airport procedures will join the ATS route direct or if a link route will be required. Connectivity to the airport will be maintained.

6.7 The 'Do-Nothing' option is **Rejected** since it would bring no benefit and did not meet the progression requirements set for the Design Principle Evaluation.

Stakeholder feedback relevant to design element

Stakeholder	Feedback	Impact
EGPF/ EGPH	Support an option that would allow the introduction of a "TUTOR" style SID from EGPH	This will be considered within the options
EGPH	"TUTOR" style SID would need additional CAS	A concept which provides connectivity requiring additional CAS is introduced
EGPH	SIDs options are to existing waypoints, could be influenced by network design	Connectivity will be developed to SID end points if not aligned to proposed network changes

Table 20: Stakeholder feedback received pertinent to the Departure concepts

Concept 1: Provide departure connectivity from airport SID end points to adjacent elements via ATS routes within existing CAS

6.8 The concept of departure connectivity option 1 is to provide connectivity to the finalised airport SIDs within the existing CAS.

6.9 These SIDs are being developed by the airports in coordination with each other and NERL. Where able the SIDs will finish at a waypoint included in the modernised ATS route network.

6.10 However, if this is not possible NERL will provision appropriate Link routes to provide connectivity between SID end point and ATS network to maximise the benefits achieved through this ACP.

6.11 The provision of this connectivity should:

- Provide a departure route that remains separated from arrivals reducing controller workload.
- Integrate efficiently with the proposed route network within the confines of CAS.

Benefits

- Increase in safety
- Reduction in controller workload
- Increase in capacity and resilience
- Connectivity will enable CCO benefit
- CDO will be benefited by further separating arriving and departing aircraft.
- Efficient connectivity should reduce fuel burn and CO_2 emissions

Issues

- Maintaining the departure routes within existing CAS prevents the most direct routes, limiting the benefit.
- SID endpoints are not yet known.

Conclusion

6.12 This option provides connectivity between the airports SIDs and the ATS route network. However, until the SID endpoints are finalised the requirement of a link route is unknown. Link routes can be designed to remain segregated from arrival aircraft enabling improved CCO, CDO, fuel and CO_2 emission benefits whilst reducing controller workload.

6.13 Design Principle Evaluation concluded that:

- 13 design principles were “Met”
- 1 design principles were “Partially Met” (1 High, 3 Med)
- 0 design principles were “Not Met” (0 High, 0 Med).

6.14 Please see Annex D: Design Principle Evaluation for detailed analysis.

6.15 This Concept was accepted and **progressed** for further consideration in the initial options appraisal.

Concept 2: Provide departure connectivity from airport SID end points to adjacent elements via ATS routes requiring additional CAS

6.16 The concept of departure connectivity option 2 is to remove the constraint of existing CAS from Option 1.

6.17 These SIDs are being developed by the airports in coordination with each other and NERL. Where able the SIDs will finish at a waypoint included in the modernised ATS route network.

6.18 However, if this is not possible NERL will provision appropriate Link routes to provide connectivity between SID end point and ATS network to maximise the benefits achieved through this ACP.

6.19 The provision of this connectivity provides the same benefits as option 1 but is not limited to the confines of CAS.

6.20 Removing this restriction will allow the introduction of link routes which would route outside of existing CAS. E.g. an Edinburgh TALLA departure from runway 06 via Y96 currently has to fly additional track mileage to remain within CAS, routing first to TLA before joining Y96. This option would enable Edinburgh to design a truncated SID that turns to NATEB sooner (Figure 46)

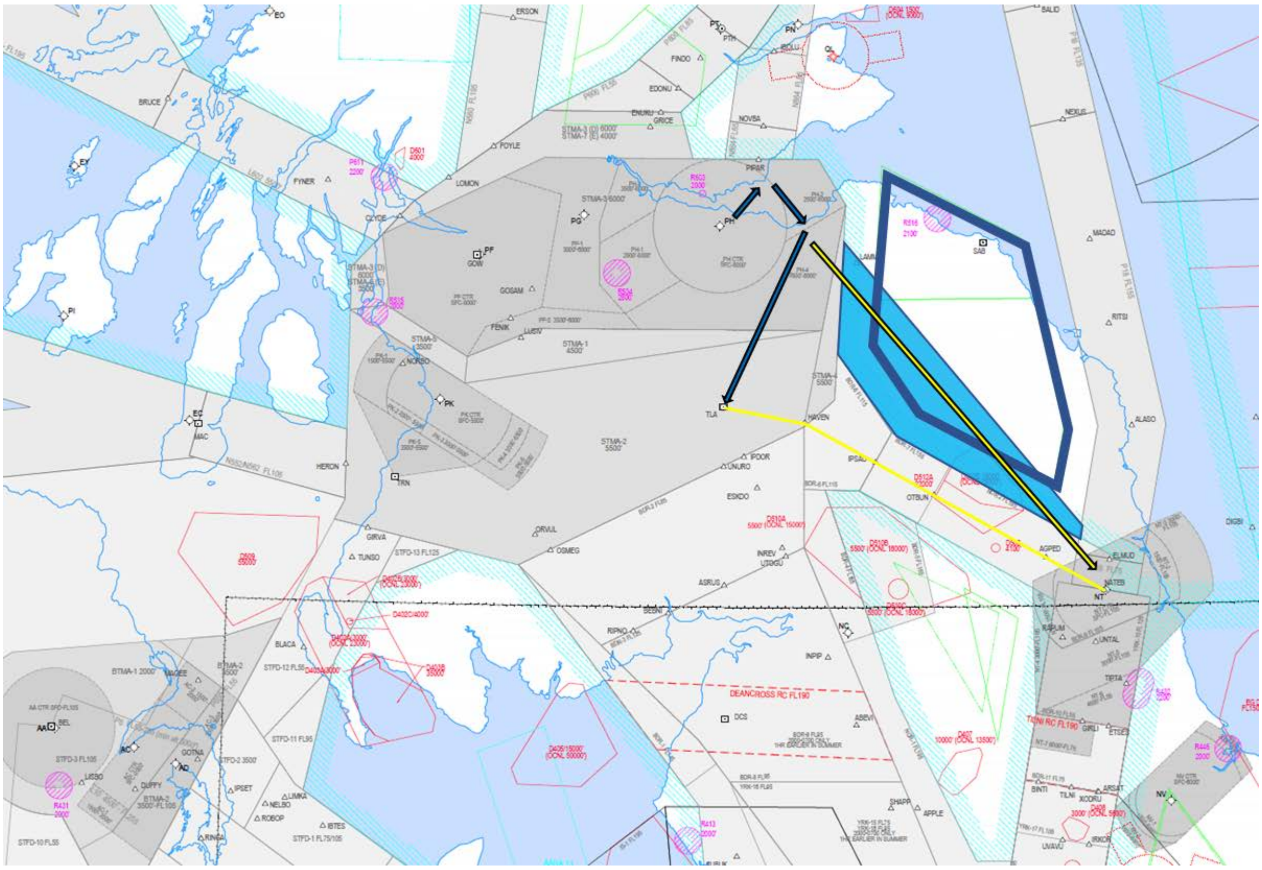

Figure 46: Adapted internal Airspace map showing an example of an early turn providing track mileage savings by routing a departure route/ link route outside of CAS. (Blue Arrows- TALLA SID, Yellow line- Y96, Yellow- arrow potential direct link route)

6.21 Enabling aircraft to take more direct routings would reduce the track mileage and reducing conflictions within the Southern ScTMA increasing capacity and resilience.

6.22 The additional CAS required to implement this option could be reduced if a systemised route structure was implemented along the extant Y96 route (South-eastern element Concepts 2 or 3).

6.23 The quantity of additional CAS required could be limited by re-joining Y96 (or equivalent ATS route) earlier and by utilising stepped basis to ensure the additional CAS volume is kept to a minimum.

6.24 When interfering with MoD/ GA operations the opportunity to offer clawback will be considered to minimise the impact upon these activities.

Benefits

- Increase in safety
- Reduction in controller workload
- Increase in capacity and resilience
- Connectivity will enable maximum CCO benefit
- CDO will be benefited by further separating arriving and departing aircraft.
- Reduced track mileage will reduce fuel burn and CO_2 emissions

Issues

- Requires additional CAS
- Impact on GA and MoD operations
- SID endpoints are not yet known.

Conclusion

6.25 This option provides connectivity between the airports SIDs and the ATS route network. However, until the SID endpoints are finalised the requirement of a link route is unknown. Link routes can be designed to remain segregated from arrival aircraft enabling improved CCO, CDO, fuel and CO_2 emission benefits whilst reducing controller workload. This option will require additional CAS which could impact MoD and GA operations.

6.26 Design Principle Evaluation concluded that:

- 10 design principles were “Met”
- 3 design principles were “Partially Met” (0 High, 3 Med)
- 0 design principles were “Not Met” (0 High, 0 Med).

6.27 Please see Annex D: Design Principle Evaluation for detailed analysis.

6.28 This Concept was accepted and progressed for further consideration in the initial options appraisal and is NERL preferred solution for providing Departure connectivity.

Arrival Connectivity

The arrival connectivity element seeks to provide connectivity between UK ATS route network and the airport holding structures.

Concept 0: Baseline

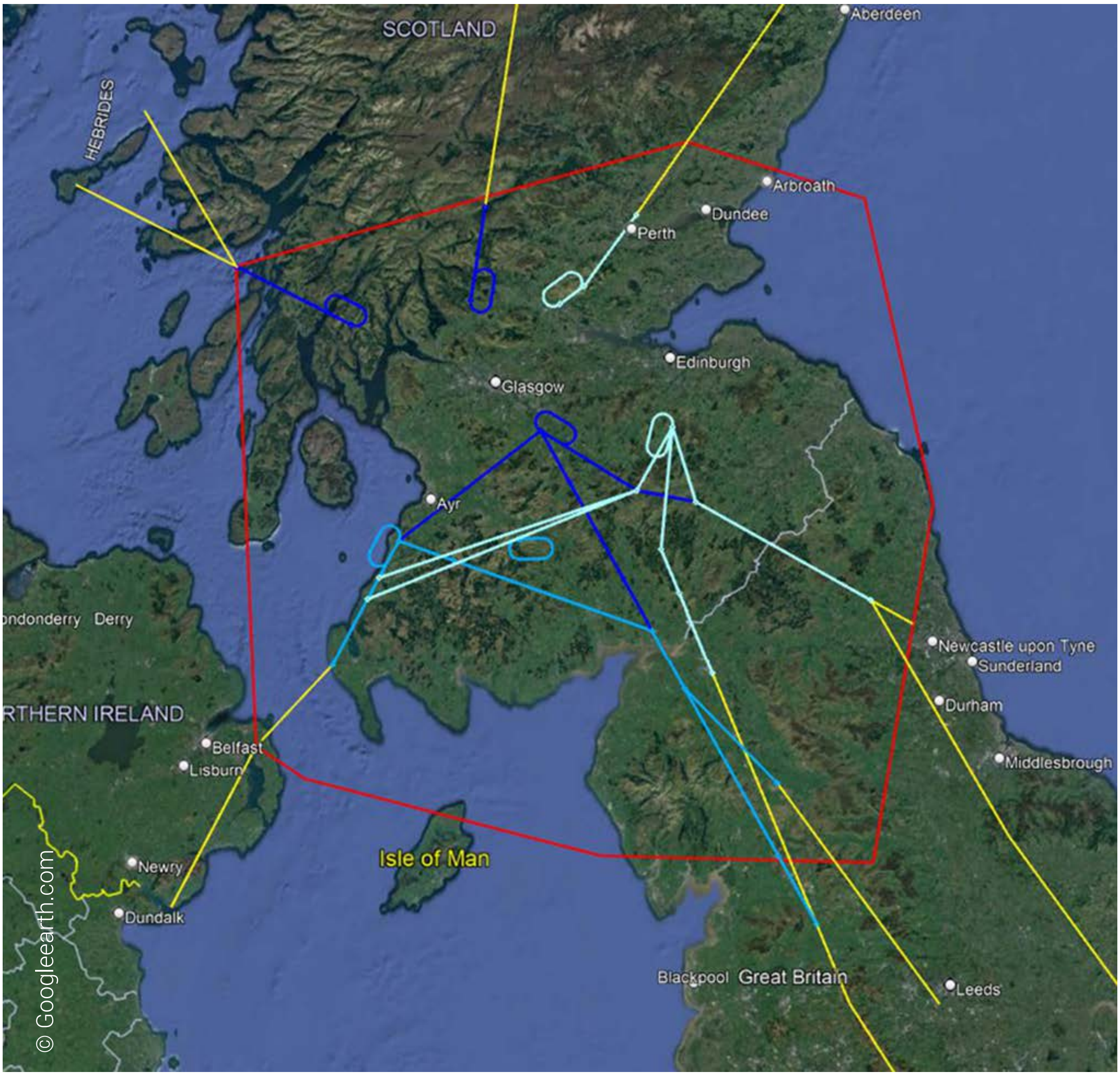

Figure 47: Existing ScTMA airport STARs and holds (light blue- Edinburgh, mid-blue- Prestwick and dark blue- Glasgow) and their route connectivity (Yellow-ATS routes).

6.29 'Do-Nothing' option representing the current day operation must be included and is used as the baseline against which all other Concepts are compared.

6.30 The three main ScTMA airports; Edinburgh, Glasgow and Prestwick all use STARs (Figure 47). A STAR is a published procedure which connects the ATS route network to an airport holding facility where they commence an approach into the airport.

6.31 The other airfields contained within the ScTMA have arrival procedures published within the relevant aerodrome section of the UK AIP (AD2.22).

6.32 Edinburgh and Glasgow airports are pursuing their own ACPs, aligned with this submission, to update their low-level procedures. These changes are being undertaken in close collaboration with each other and NERL to ensure the airspace remains fully compatible. Until the airport arrival options are defined NERL are unable to determine the preferred hold locations. Connectivity to the airport holds will be maintained.

6.33 The 'Do-Nothing' option is **Rejected** since it would bring no benefit and did not meet the progression requirements set for the Design Principle Evaluation.

Stakeholder feedback relevant to design element

Stakeholder	Feedback	Impact
EGPK	Increased CAS west of the TMA could alleviate congestion and reduce fuel burn	This will be considered in the developed concepts
EGPK	CTAs should accommodate aircraft descent profiles	This will be considered as the options are developed
EGPF	Increased CAS west of the TMA to allow a redistribution of traffic to the north of EGPF is unfavourable	This will be considered as the options are developed

Table 21: Stakeholder feedback received pertinent to the Arrival concepts

Concept 1: Provide arrival connectivity from ATS route network to airport arrival structure via STARS within existing CAS

6.34 The concept of arrival connectivity option 1 is to provide connectivity from the UK ATS route network to the finalised airport hold within the existing CAS.

6.35 The airports are, in coordination with each other and NERL, redesigning their low-level procedures. Until a better understanding of how the airports plan to route the approach procedures, it is not possible to determine the preferred hold location and subsequently it is not possible to design a STAR as the end point is not yet known.

6.36 Preferred hold locations will be confirmed following the stage 2 submissions as concepts get developed into defined solutions for the Stage 3 consultation.

6.37 STARs will be introduced which connect the modernised ATS route network to the required airport holding structure.

6.38 The provision of this connectivity should:

- Provide an arrival route that remains separated from departures reducing controller workload.
- Integrate efficiently with the proposed route network within the confines of CAS.

Benefits

- Increase in safety
- Reduction in controller workload
- Increase in capacity and resilience
- Connectivity will enable CDO benefit will be benefited by further separating arriving and departing aircraft.
- CCO will be benefited by further separating arriving and departing aircraft
- Efficient connectivity should reduce fuel burn and CO_2 emissions

Issues

- Maintaining the STARs within existing CAS reduces the options available to limit conflictions.
- Maintaining the STARs within existing CAS
- Planned airport arrival procedures are not yet known to define preferred hold locations.

Conclusion

6.39 This option provides connectivity between the ATS route network and the airport holding structure by the provision of STARs. However, until the STAR endpoints are finalised the potential STAR routing is unknown. STARs will be designed to remain segregated from departure aircraft enabling improved CCO, CDO, fuel and CO_2 emission benefits whilst reducing controller workload.

6.40 Design Principle Evaluation concluded that:

- 13 design principles were “Met”
- 0 design principles were “Partially Met” (0 High, 0 Med)
- 0 design principles were “Not Met” (0 High, 0 Med).

6.41 Please see Annex D: Design Principle Evaluation for detailed analysis.

6.42 This Concept was accepted and progressed for further consideration in the initial options appraisal.

Concept 2: Provide arrival connectivity from ATS route network to airport arrival structure via STARs requiring new CAS

6.43 The concept of arrival connectivity option 2 is to remove the constraint of existing CAS from Option 1.

6.44 STARs will be introduced which connect the modernised ATS route network to the required airport holding structure.

6.45 The provision of this connectivity should:

- Provide an arrival route that remains separated from departures reducing controller workload.
- Integrate efficiently with the proposed route network but not be limited by the existing CAS boundaries.

6.46 The provision of this connectivity provides the same benefits as option 1 but is not limited to the confines of CAS.

6.47 Removing this restriction will allow the introduction of STARs which could enable a reduction/ simplification in conflictions by redistributing arrival traffic away from the busy southern portion of the ScTMA. An indicative example of this is shown in Figure 48, where the Glasgow traffic arriving from the southwest via P600 currently fly the BLACA 1G STAR. This proposal would introduce additional CAS to the West of the ScTMA so that this traffic could route north and hold at FYNER or equivalent hold.

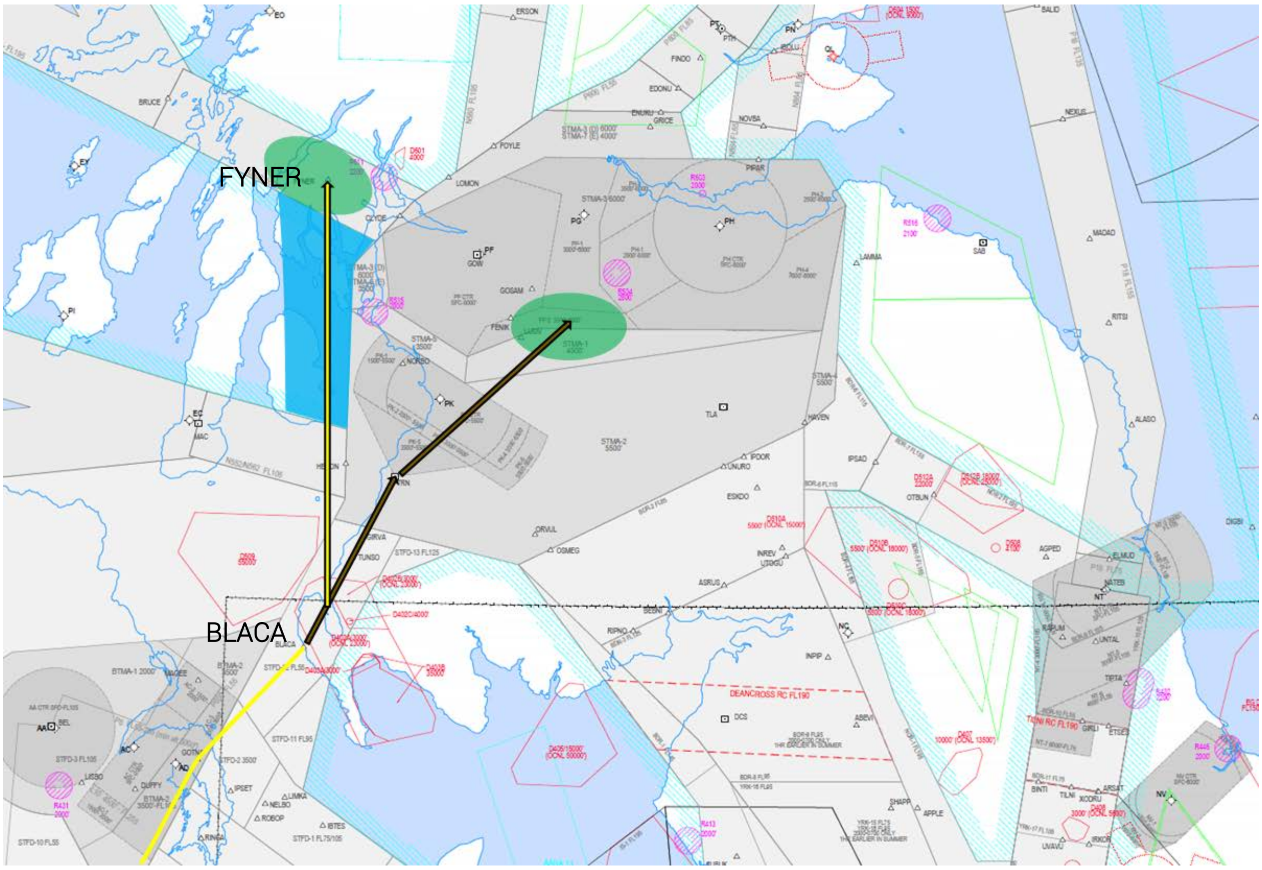

Figure 48: Adapted internal Airspace map showing an example of an early turn that could relocate arrival aircraft into airspace which is less congested routing a departure route/ link route outside of CAS. (Brown Arrows-BLACA 1G STAR, Yellow line- P600, Yellow- arrow potential new STAR to FYNER or equivalent hold)

6.48 This option is anticipated to have a comparable track mileage to the existing STAR but would remove conflictions in the southern ScTMA area, resulting in a reduction in fuel burn and CO_2 emissions, improved route adherence resulting in a reduction in controller load and improved capacity and resilience.

6.49 Currently, arriving aircraft are descended early to deconflict against the departing aircraft. By moving these aircraft to the north of the airfield, they can remain higher for longer, reducing fuel burn and CO_2 emissions.

Benefits

- Increase in safety
- Reduction in controller workload
- Increase in capacity and resilience
- Fuel burn will be reduced by allowing arriving aircraft to descend later
- CDO will be benefited by further separating arriving and departing aircraft.
- Connectivity will enable maximum CCO benefit

Issues

- Requires additional CAS
- May impact airport operations
- Likely impact on GA and MoD operations

Conclusion

6.50 This option provides connectivity between the ATS route network and the airports holding structures without the constraint of existing CAS. By providing additional airspace for the STARs, aircraft can be redistributed within the ScTMA providing fuel capacity and resilience benefits by reducing conflictions and reducing controller workload. Glasgow airport has indicated the example shown may impact their northerly departure options which would require further evaluation. This option will require additional CAS which could impact MoD and GA operations.

6.51 Design Principle Evaluation concluded that:

- 10 design principles were “Met”
- 3 design principles were “Partially Met” (0 High, 3 Med)
- 0 design principles were “Not Met” (0 High, 0 Med).

6.52 Please see Annex D: Design Principle Evaluation for detailed analysis.

6.53 This Concept was accepted and progressed for further consideration in the initial options appraisal and is NERL preferred solution for providing Departure connectivity.

Arrival Structure Concepts

The arrival structure element seeks to provide delay absorption mechanisms for aircraft arriving at the ScTMA airfields.

Concept 0: Baseline

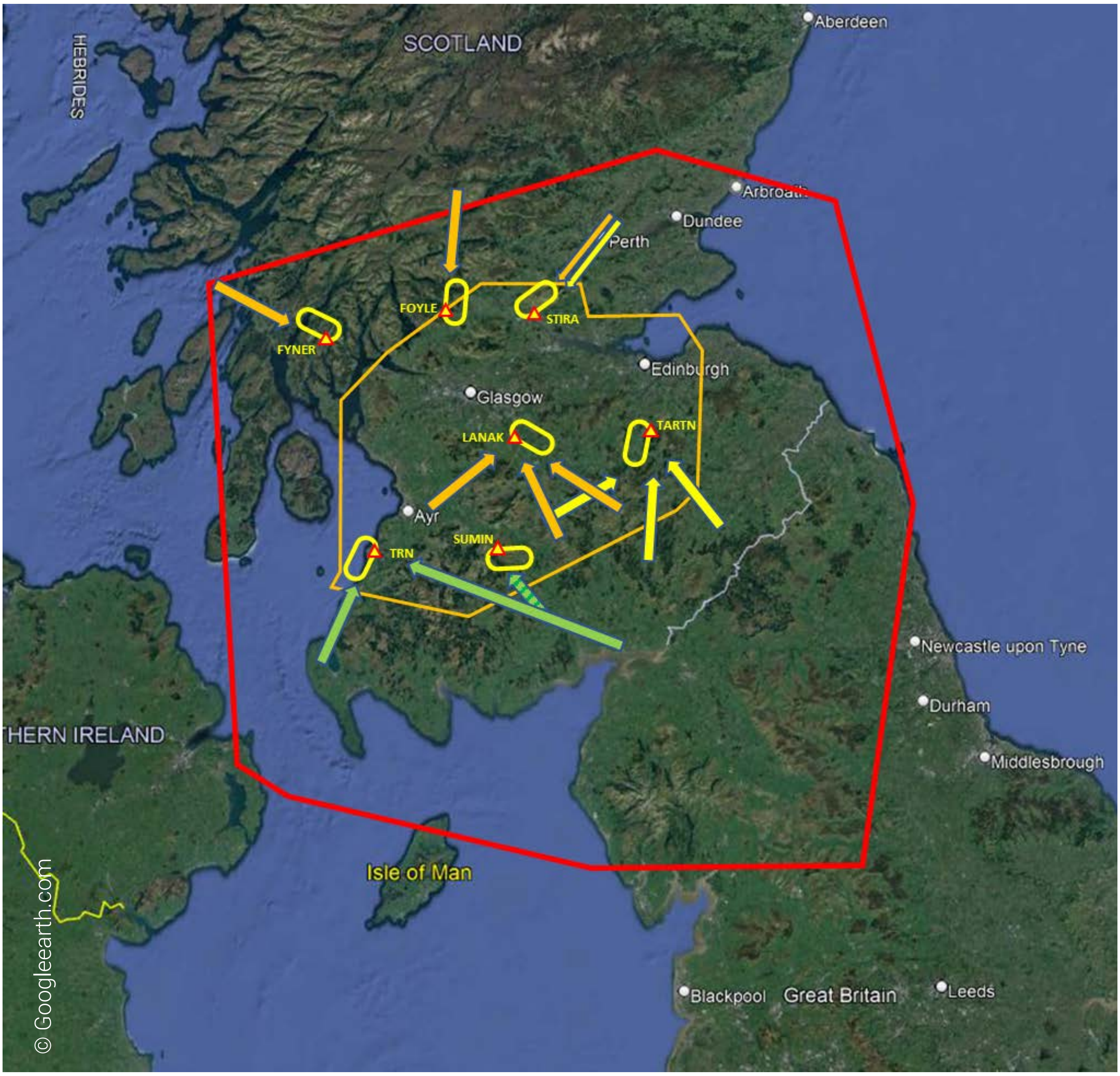

Figure 49: Geographic location of extant ScTMA Holds and traffic flows supply them. (Yellow arrows is EGPH traffic, Orange arrows are EPPF traffic and green arrows EGPK traffic)

6.54 A 'Do-Nothing' option representing the current day operation must be included and is used as the baseline against which all other Concepts are compared.

6.55 Holding structures are included at the end of an airport arrival procedure to safely delay aircraft which are unable to land or continue their flights due to capacity constraints. This delay could be the result of predictable demand, i.e multiple aircraft arriving simultaneously or unplanned events, i.e a runway closure.

6.56 In the event of a predictable delay. ATC endeavours to absorb this within the enroute phase of flight, however, this is not always possible for an unplanned event.

6.57 The three main ScTMA airports; Edinburgh, Glasgow and Prestwick have use of the following radial holds which are also shown in Figure 49:

- FYNER (Glasgow, FL70-140)
- FOYLE (Glasgow, FL70-140)
- LANARK (Glasgow, FL70-140)
- STIRA (Shared hold between Glasgow and Edinburgh, FL70-140)
- TARTN (Edinburgh, FL70-140)
- TRN (Prestwick, 6,000 ft – FL90)
- SUMIN (SUMIN, 6,000 ft – FL90)

6.58 Radar data from 5-11 August 2019, a busy summer week before the Covid-19 downturn, demonstrates that the TARTN and LANARK holds are both regularly utilised, STIRA and FYNER are less regularly used and TRN, SUMIN and FOYLE only have limited use.

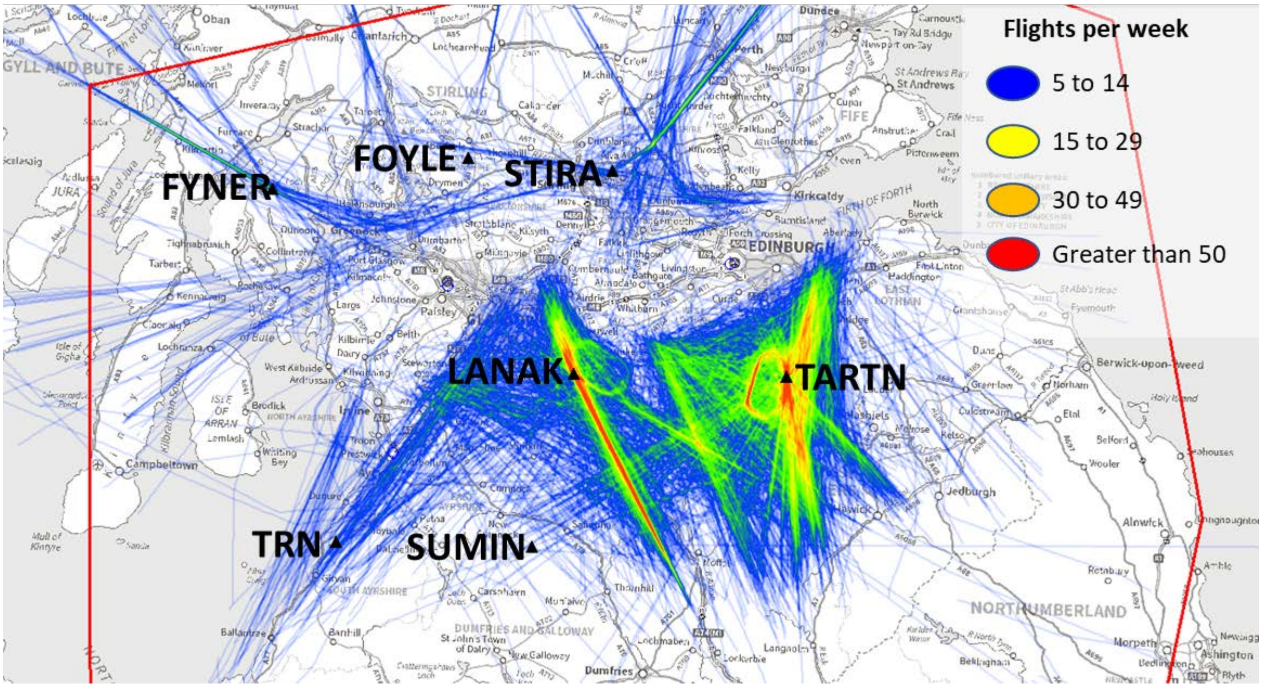

Figure 50: ATC Playback Track Density plot for ScTMA arrivals (5500 ft to FL145, Aug 5-11 2019)

6.59 Edinburgh and Glasgow airports are pursuing their own ACPs, aligned with this submission, to update their low-level procedures. These changes are being undertaken in close collaboration with each other and NERL to ensure the airspace remains fully compatible. Until the airport arrival options are defined NERL are unable to determine if the existing holds are in the preferred hold locations.

6.60 Edinburgh and Glasgow have indicated their preference not to use shared holds, i.e. STIRA.

6.61 The 'Do-Nothing' option is Rejected since it would bring no benefit and did not meet the progression requirements set for the Design Principle Evaluation.

Stakeholder feedback relevant to design element

Stakeholder	Feedback	Impact
Airline operators/ EGPH/ EGPF	Point merge is not favoured	Point merge is discounted as a design option following DP Evaluation
EGPH/ EGPF	Provided view on overhead holds	Overhead holds were considered and discounted owing to stakeholder feedback
EGPH	Amended SIDs could impact hold locations	SID routes will be considered during the option development
EGPH/ EGPF	Provided proposals on hold locations	This will be considered in the option development
EGPH	Would better support TALLA SID options if TARTN hold moved west	This will be considered in the option development

Table 22: Stakeholder feedback received pertinent to the Arrival Structure concepts

Concept 1: Review existing holds and introduce new radial holds where required

6.62 The concept of arrival structure concept 1 is to review the existing holds (with the intention of either keeping, amending or removing them) and to introduce new radial holding structures as required.

6.63 The ScTMA airspace requires holds to absorb delay for arriving aircraft as needed. However, the location and number of holds is not yet known and will be dependent on the ATS route options and the airports planned arrival procedures. This option is about the type of holding structure, not the location although initial airport engagement, detailed below has provided some information on the suitability of certain locations.

6.64 Radial holds are racetrack type structures with set levels to absorb delay. Each level is 1,000 ft apart and can occupy a single aircraft.

6.65 These structures have a set dimension and are located over a holding fix.

6.66 The holding fix can be on the ATS route or away from it and are reached by STARs or flight plannable DCTs.

6.67 Engagement with Edinburgh and Glasgow airport has been used to garner the airports initial thoughts on potential locations. This has indicated that:

- A shared hold is inhibitive to both Edinburgh's and Glasgow's operation; and
- A hold in the other airports overhead is not desirable.

6.68 Both Edinburgh and Glasgow airports were provided with a set of indicative hold locations and asked to provide feedback on their suitability.

6.69 Edinburgh airport was asked to consider the potential hold locations shown in Figure 51

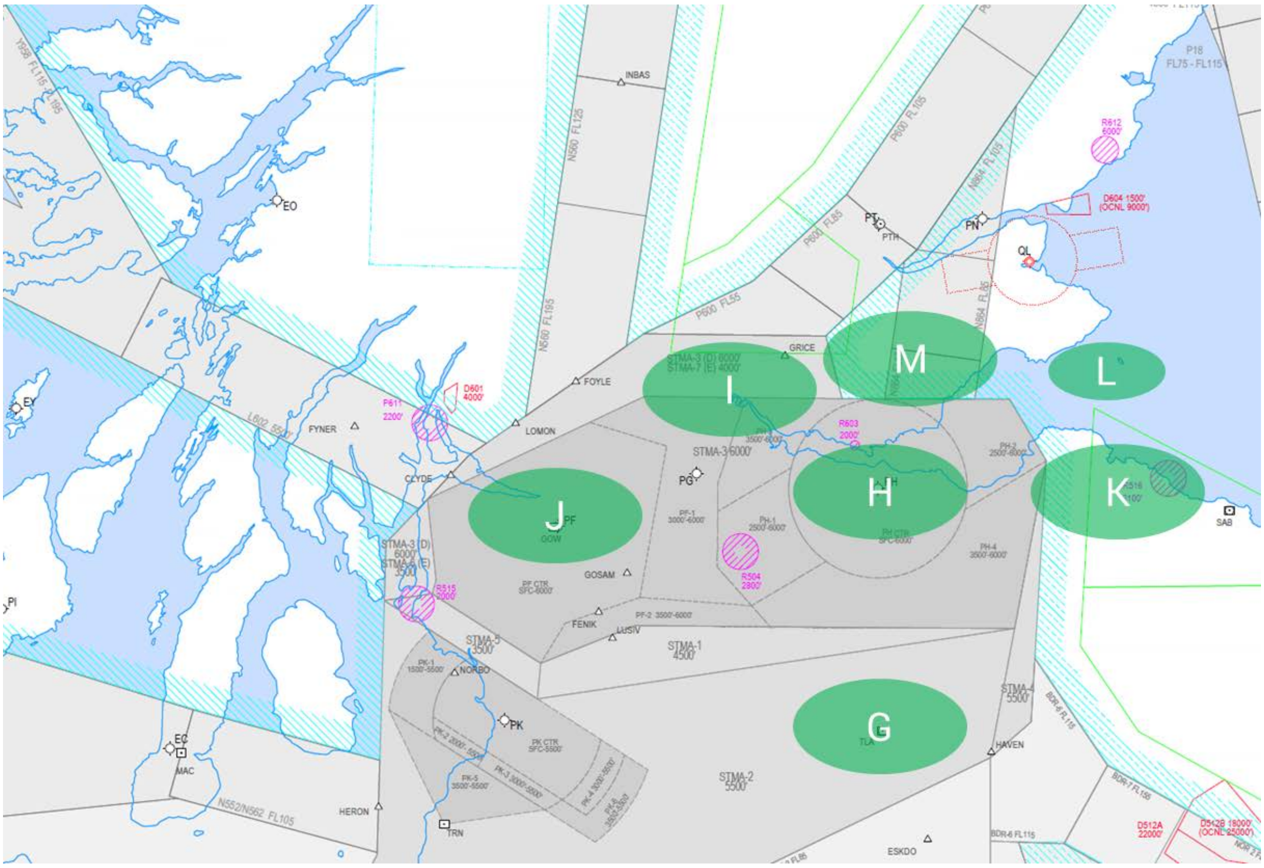

Figure 51: Adapted internal Airspace map showing potential locations of radial holds which could serve Edinburgh airport.

6.70 Feedback indicated that locations K and M would be unsuitable due to interactions with other airspace users. Location J is overhead Glasgow airport and would be difficult to manage due to Glasgow operations.

6.71 A hold in the vicinity of Location G was considered ideally located for arrivals from the South. This traffic is the majority of Edinburgh arrivals.

6.72 Location I is a similar location to the existing hold STIRA and would be well placed to serve arrivals from the south-west, west and north.

6.73 A hold located in the vicinity of L could serve Edinburgh arrivals from Northern Europe should the new Eastern element connectivity be introduced.

6.74 Glasgow airport was asked to consider the potential hold locations shown in Figure 52.

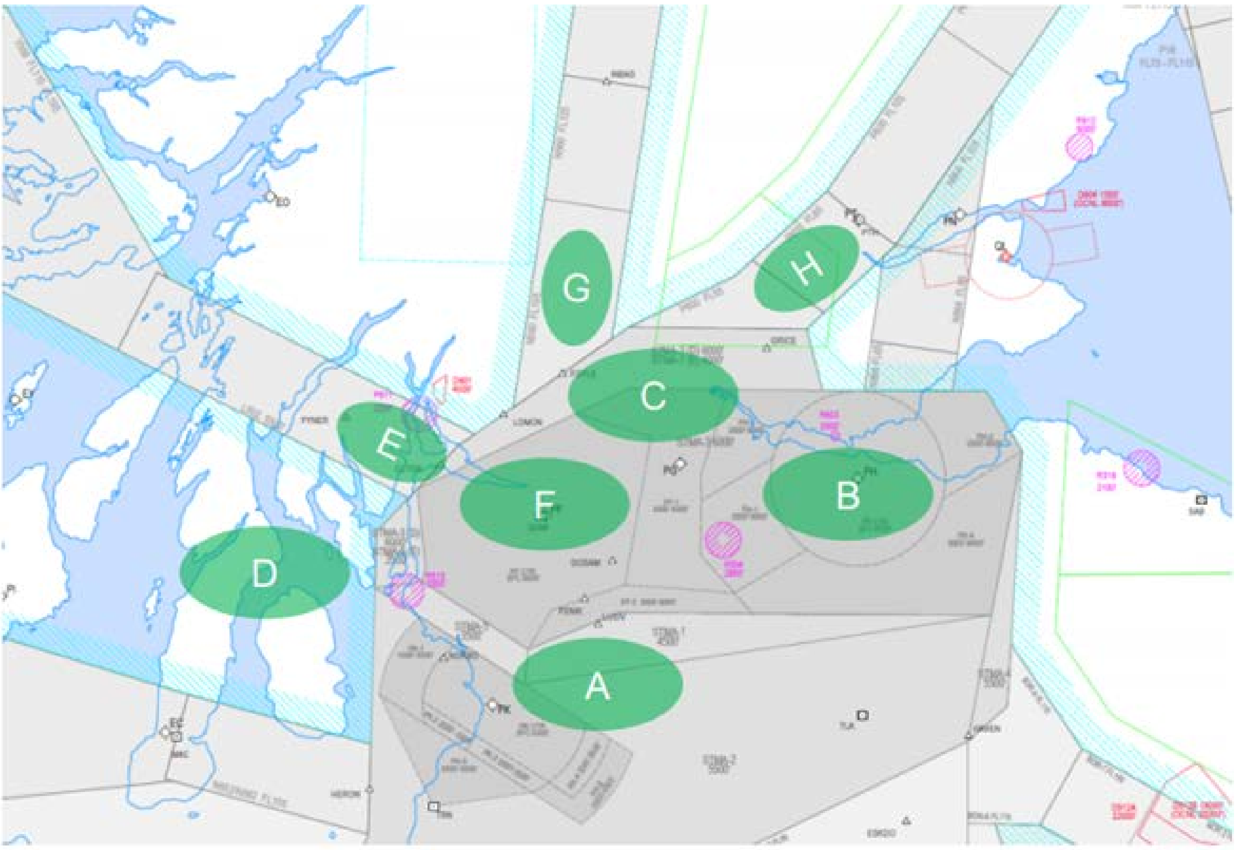

Figure 52: Adapted internal Airspace map showing potential locations of radial holds which could serve Glasgow airport.

6.75 Feedback indicated that locations B, D and H would be unsuitable due to the location not being aligned with current and arrival route options contained within the Glasgow airport ACP.s.

6.76 A hold in the vicinity of Location A was considered ideally located for arrivals from the South.

6.77 Location C is a similar location to the existing hold STIRA and would be well placed to serve arrivals from the south-west, west and north. However, if C was not achievable G could be a suitable alternative.

6.78 Location E is a similar location to the existing hold FYNER and would be well placed to serve arrivals from the north-west.

6.79 A hold overhead Glasgow could be suitable but would be inefficient due to aircraft having to fly away from the airfield and then come back.

6.80 The airports are, in coordination with each other and NERL, are redesigning their low-level procedures. Until a better understanding of how the airports plan to route the approach procedures, it is not possible to determine the preferred hold location, best aligned with the en-route changes and the airport approach procedures

6.81 Preferred hold locations will be confirmed following the stage 2 submissions as concepts get developed into defined solutions for the Stage 3 consultation.

6.82 The preferred hold locations may require additional controlled airspace to ensure they can be safely positioned for low level and enroute operations.

6.83 The hold locations proposed in stage 3 will be determined through continued engagement with the airports and will be positioned to maximise capacity and resilience.

Benefits

- Holds can be better positioned for traffic locations
- Controller familiarity with radial holds
- Increase in capacity and resilience
- Hold locations will enable CDO benefit.
- CCO will be benefited by further separating arriving and departing aircraft
- Optimal locations should reduce fuel burn and CO_2 emissions

Issues

- Hold locations are not yet determined
- Hold locations may require new CAS
- Sequencing is not as straight forward as a point merge/ trombone structure.

Conclusion

6.84 This option will provide the required airport holding structures best aligned with the low-level airport led changes and the en-route changes made by this ACP. However, until the airport led changes are determined it is not possible to define the hold locations and this option is focused on the type of holding structure. Radial holds provide a suitable and compatible delay absorbing structure.

6.85 Design Principle Evaluation concluded that:

- 10 design principles were "Met"
- 3 design principles were "Partially Met" (0 High, 3 Med)
- 0 design principles were "Not Met" (0 High, 0 Med).

6.86 Please see Annex D: Design Principle Evaluation for detailed analysis.

6.87 This Concept was accepted and progressed for further consideration in the initial options appraisal.

Concept 2: Review existing holds and introduce new lateral delay absorption structures (i.e. point merge, trombone etc.)

6.88 The approach used for Concept 2 is to introduce a lateral delay absorption structure after a radial hold to enable sequencing of the aircraft.

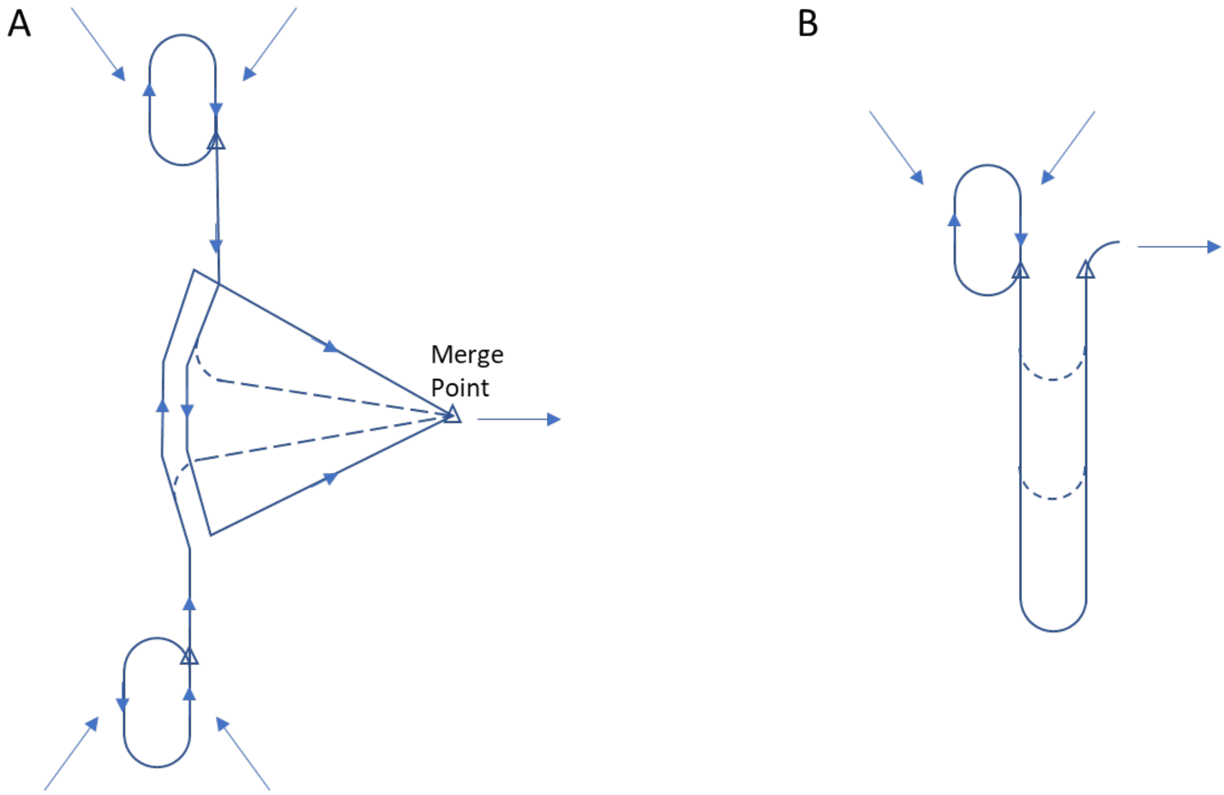

Figure 53: Example lateral delay absorption structures. A- Point merge structure, B- trombone structure. Solid line represents planned route, dashed line represents indicative early turns to introduce spacing.

6.89 This option will require radial holds in addition to the lateral structures as aircraft may not be able to continue their approach as soon as the reach the ScTMA.

6.90 Aircraft when cleared on their approach to the airport follow a set route and when suitably spaced are instructed by ATC to turn to the merge point.

6.91 This type of structure allows controllers to easily space aircraft by following a simple reproducible procedure.

6.92 However, these structures require a large airspace volume limiting the ability to remain clear of departing aircraft or other airspace users.

6.93 Following the merge point aircraft can follow a set route, a transition, to the airfield requiring minimal controller intervention. Without a transition the benefit of sequencing aircraft in this manner is lost

6.94 Like option 1, the location of these structures has yet to been determined however they would be selected to maximise the benefit.

Benefits

- Improved safety
- Reduction in controller workload (approach)
- Increase in capacity and resilience
- Point merge will enable CDO predictability.
- CCO will be benefited by further separating arriving and departing aircraft
- Optimal locations could reduce actual fuel burn and CO_2 emissions

Issues

- Hold locations are not yet determined
- Uses a large area
- Requires associated contingency radial holds
- Operators have to flight-plan for the entire structure.
- Reduced benefit if airport does not introduce transitions from the merge point.
- Reduction in controller skills erosion.

Conclusion

6.95 The use of lateral delay absorption structures would allow the en-route controllers to present sequenced aircraft to the airport controllers to complete the approach phase of flight. However, these structures are in addition to radial hold(s), and they need a large volume of airspace. Aircraft are required to flight plan the entirety of the airspace structure resulting in an increase in fuel uplift. The sequencing benefit of these structures are lost if they are not coupled with a transition from the merge point to the airfield. The exclusion of this option from the en-route ACP does not prohibit an airport considering these holding options within their ACPs.

6.96 Design Principle Evaluation concluded that:

- 7 design principles were “Met”
- 1 design principles were “Partially Met” (0 High, 0 Med)
- 5 design principles were “Not Met” (2 High, 3 Med).

6.97 Please see Annex D: Design Principle Evaluation for detailed analysis.

6.98 This Concept was **Rejected** for further consideration as it did not meet the progression requirements set for the Design Principle Evaluation.

7. Step 2a Conclusion and Next Steps

7.1 The impacted airspace was split into 6 geographical elements each presenting their own opportunities to modernise the ScTMA.

7.2 We have engaged with our stakeholder audience, resulting in comprehensive discussions on the possibilities for the ScTMA airspace change.

7.3 This engagement has led to a comprehensive long list of viable design option concepts for each element which address the SoN and aligns with the Design Principles from Stage 1 of the Airspace change process CAP1616.

7.4 We have identified all viable options, noting that the Masterplan is a high level coordinated implementation plan of a series of individual airspace design changes, that need to be developed in coordination to achieve the range of benefits that modernisation can deliver.

7.5 We also state that at this stage we have no reason to believe the indicative design options would not comply with the required technical criteria, once fully refined.

7.6 These long lists of concepts have been illustrated within this documentation and developed through continued stakeholder feedback and engagement.

7.7 These concepts have been evaluated against the Design Principles from Stage 1 of the Airspace change process CAP1616 which has resulted in the following shortlist of options for each element.

Element	Design Concept	Description
Eastern	Concept 4	*Systemised routes avoiding gliding area*
	Concept 8	*Systemised routes impacting gliding area*
South-Eastern	Concept 3	*Systemised route with lowered CAS bases*
Southern	Concept 3	*Systemised routes orientated according to traffic flow*
	Concept 4	*Systemised routes orientated according to traffic flow including a review of CAS bases*
South-Western	Concept 1	*Systemised Routes*
Northern	Concept 1	*Bi-directional route structure and review bases*
Central	Concept 1	*Provide ATS route connectivity to/between surrounding elements within existing CAS*
Departure Connectivity	Concept 1	*Provide departure connectivity from airport SID end points to adjacent elements via ATS routes within existing CAS*
	Concept 2	*Provide departure connectivity from airport SID end points to adjacent elements via ATS routes requiring new CAS*
Arrival Connectivity	Concept 1	*Provide arrival connectivity from ATS route network to airport arrival structure via STARs within existing CAS*
	Concept 2	*Provide arrival connectivity from ATS route network to airport arrival structure via STARs requiring additional CAS*
Arrival Structure	Concept 1	*Review existing holds and introduce new radial holds where required*

Table 23: Shortlisted Concept Options for each Element

7.8 These shortlisted options have been carried forward to Stage 2B.

7.9 The overall timeline for this ACP is consistent with Iteration 2 of the Masterplan for the regional cluster within which this ACP sits.

8. Annex A: Summary of Stakeholder Engagement

This section summarises the external stakeholder engagement activities conducted during stage 2. Copies of the engagement material will be sent unredacted to the CAA so they can make sure our engagement was effective.

We met with representative stakeholder groups to discuss our design concepts and discus how these Concepts could align with the airports own ACPs. Each engagement activity either provided an overview of everything being considered or addressed a particular issue. The majority of the stakeholders are the same as those we engaged with in Stage 1.

The engagement activities typically followed this format (this is the "we asked…" element of the typical cycle "we asked, they said, we did"):

- Introductions and scene setting, background to the ScTMA, if required
- Airspace change CAP1616 process and the role of stakeholders, design principles, if required
- Today's situation in the region, if required.
- Progress to date and illustrations of concepts for consideration
- Impacts on, and mitigations for, the interests of this stakeholder – two-way discussion
- Summarise discussions
- Process notes, conclusions and close
- Minutes and a copy of the presentation sent out afterwards, sometimes extra email feedback acquired

Due to restrictions surrounding the on-going Covid-19 pandemic, in person engagement has been restrictive. As such, face to face engagement activities have predominantly been undertaken remotely using TEAMS. Table 5 lists the meetings held, giving the date of the primary engagement activity only (subsequent calls/emails etc not listed in this summary), and the primary discussion points.

An example presentation is included on the CAA portal, so you can see how we explained this proposal's development to our participating stakeholder groups.

All stakeholders targeted during Stage 1 have had the opportunity to attend at least 1 engagement session during Stage 2. However, not all stakeholders have attended.

Meeting Date	Host	Audience	Activity
10/06/2021	ACOG	NERL/ EGPF/ EGPH/ ACOG	ScTMA Deployment Coordination Meeting
03/08/2021	ACOG	NERL/ EGPF/ EGPH/ ACOG	ScTMA Tech Coordination Meeting
09/08/2021	ACOG	NERL/ EGPF/ EGPH/ ACOG	ScTMA Deployment Coordination Meeting
10/08/2021	EGPH	NERL/ EGPF/ EGPH/ ACOG	Options Workshop to discuss early options under consideration by NERL, EGPH and EGPF and CAP1616 approach
01/09/2021	NERL	NERL/ DAATM/ SWK Mil	Early engagement with MoD to garner feedback on NERL early options

07/09/2021	ACOG	NERL/ EGPF/ EGPH/ ACOG	ScTMA Tech Coordination Meeting
28/09/2021	NERL	NERL/ EGPF/ EGPH/ ACOG	ScTMA Workshop 1: Workshop to present concepts for the route connectivity to the Airports arrival Structure
30/09/2021	NERL	NERL/ EGPF/ EGPH/ ACOG	ScTMA Workshop 2: Workshop to present concepts for the Airports arrival Structure
01/10/2021	NERL	NERL/ EGPF/ EGPH/ ACOG	ScTMA Workshop 3: Workshop to present concepts for the route connectivity from the Airports SIDs and the route network
05/10/2021	ACOG	NERL/ EGPF/ EGPH/ ACOG	EGPF presentation to update and inform NERL and Edinburgh on their options being considered.
02/11/2021	NERL	NERL/ EGPF/ EGPH/ ACOG	NERL presentation to EGPF/ EGPH on the use of point merge as an arrival procedure and to gauge airports views on the potential use of a point merge
05/11/2021	ACOG	NERL/ EGPF/ EGPH/ ACOG	EGPF presentation to update and inform NERL and Edinburgh on their options being considered.
09/11/2021	ACOG	NERL/ EGPF/ EGPH/ ACOG	ScTMA Deployment Coordination Meeting
17/11/2021	NERL	NERL/ EGPF/ EGPH	NERL presentation to update and inform Edinburgh and Glasgow of the options NERL are considering for the ScTMA redesign.
01/12/2021	EGPF	Public event	EGPF presentation of design options to their stakeholders
06/12/2021	NERL	NERL, EGPF and EGPH	Follow up to NERL presentation to EGPF/ EGPH on the use of point merge as an arrival procedure and to gauge airports views on the potential use of a point merge (02/112/2021)
07/12/2021	ACOG	NERL/ EGPF/ EGPH/ ACOG	ScTMA Tech Coordination Meeting to provide an overview of all ACP work
08/12/2021	NERL	NERL, Lead Operator Carrier Panel (LOCP)	NERL presentation to the LOCP of the long list options NERL are considering for the ScTMA redesign.
09/12/2021	NERL	DAATM and SWK Mil	NERL presentation to the MoD of the long list options NERL are considering for the ScTMA redesign.
13/12/2021	EGPN	EGPN-FLOPSC and Logan Air	NERL presentation to EGPN- Flight Operations Performance and Safety Committee (FLOPSC)[11] of the long list options NERL are considering for the ScTMA redesign.

[11] An Airports FLOPSC is a committee that deals with the aspects impacting the flight and operational safety at the airport and includes base captain representation for the fleets.

10/01/2022	EGPH	EGPH FLOPSC and based airlines	NERL presentation to EGPH- Flight Operations Performance and Safety Committee (FLOPSC) [12] of the long list options NERL are considering for the ScTMA redesign.
18/01/2022	ACOG	NERL/ EGPF/ EGPH/ ACOG	ScTMA Deployment Coordination Meeting
18/01/2022	NERL	NERL and MoD	Informal meeting to offer further support for Stage 2 feedback
28/01/2022	NERL	NERL, EGPH and EGPF	NERL ScTMA Visualisation Simulations phase 1. Presentation of 3 holistic solutions indicating how the ScTMA final design could look to garner airport feedback
04/02/2022	NERL	NERL, EGPH and EGPF	Visualisation Simulation feedback to discuss Vis Sim 2 inclusions (EGPF Focus)
07/02/2022	NERL	NERL, EGPH and EGPF	Visualisation Simulation feedback to discuss Vis Sim 2 inclusions (EGPH Focus)
08/02/2022	NERL	NERL, EGPH, BGA, LAA	NERL and EGPH presentation to BGA and LAA of the long list options NERL are considering for the ScTMA redesign. Discussions surrounding airspace compromise were undertaken.
10/02/2022	NERL	NERL, EGPK	NERL presentation to EGPK of the long list options NERL are considering for the ScTMA redesign.
11/02/2022	NERL	NERL, EGPH and EGPF	Meeting to discuss Timebound SID Capability.
11/02/2022	NERL	NERL, BaE Warton	NERL presentation to BaE Warton of the long list options NERL are considering for the ScTMA redesign.
23/02/2022	NERL	NERL, EGPH Head of Airspace (HoA)	Clarification of interpretation of EGPH feedback to EGPH Feedback following 17/11/2022 engagement.
08/03/2022	NERL	NERL, Prestwick Safety Performance Improvement Group (SPIG)	Short presentation summary of ACP status, Vis sims 1 and 2 concepts and findings
14/03/2022	NERL	NERL, CAA	Presentation of Visualisation Simulation work to the CAA
15/03/2021	ACOG	NERL/ EGPF/ EGPH/ ACOG	ScTMA Deployment Coordination Meeting
16/03/2022	NERL	NERL, EGPH and EGPF	Follow up meeting to discuss Timebound SID Options.
16/03/2022	EGPF	NERL, EGPF	NERL presentation to EGPF- FLOPSC of the long list options NERL are considering for the ScTMA redesign.

18/03/2022	NERL	NERL, EGPH and EGPF	NERL ScTMA Visualisation Simulations phase 2. Presentation of 6 holistic solutions indicating how the ScTMA final design could look following airport feedback to Phase 1 SIMs to garner feedback on.
25/03/2022	NERL	NERL, MoD	MoD engagement following completion of Visualisation simulations update
25/03/2022	NERL	NERL, Cumbernauld	NERL presentation to Cumbernauld of the long list options NERL are considering for the ScTMA redesign.
30/03/2022	NERL	NERL, Stakeholder Airlines	Presentation of design concepts to stakeholder airlines
06/04/2022	NERL	NERL, EGPF	NERL presentation to EGPF IFP Consultants Vis Sim 2 designs following airport feedback to Phase 1
06/04/2022	EGPH	NERL EGPH	ACP Design Workshop
08/04/2022		NERL, ACP Stakeholders not previously captured	NERL presentation of design concepts to stakeholders listed in Stage 1 not previously engaged during Stage 2.

List of Stakeholders

Organisation	Notes
Edinburgh Airport	
Glasgow Airport	
Glasgow Prestwick Airport	
Cumbernauld Airport	
Strathaven Airfield	
EasyJet	Accounted for 22.1% of departures from Edinburgh Airport in 2019
RyanAir	Accounted for 18.3% of departures from Edinburgh Airport in 2019
Logan Air	Accounted for 8.7% of departures from Edinburgh Airport in 2019
BA Cityflyer	Accounted for 5.2% of departures from Edinburgh Airport in 2019
Jet2	Accounted for 5% of departures from Edinburgh Airport in 2019
KLM	Accounted for 2.7% of departures from Edinburgh Airport in 2019
Lufthansa	Accounted for 1.5% of departures from Edinburgh Airport in 2019
Air France	Accounted for 1.4% of departures from Edinburgh Airport in 2019
United Airlines	Accounted for 1.2% of departures from Edinburgh Airport in 2019
TUI	Accounted for 1.0% of departures from Edinburgh Airport in 2019
Qatar Airways	Accounted for 0.8% of departures from Edinburgh Airport in 2019
SAS	Accounted for 0.8% of departures from Edinburgh Airport in 2019
Delta Airways	Accounted for 0.7% of departures from Edinburgh Airport in 2019
Turkish Airlines	Accounted for 0.6% of departures from Edinburgh Airport in 2019
Emirates	Accounted for 0.6% of departures from Edinburgh Airport in 2019
Gama Aviation	Accounted for 0.1% of departures from Edinburgh Airport in 2019
Airlines UK	Relevant organisation from the NATMAC distribution list
Airspace4All	Relevant organisation from the NATMAC distribution list
Airport Operators Association (AOA)	Relevant organisation from the NATMAC distribution list
Airfield Operators Group (AOG)	Relevant organisation from the NATMAC distribution list
Aircraft Owners and Pilot Association (AOPA)	Relevant organisation from the NATMAC distribution list
Airspace Change Organising Group (ACOG)	Relevant organisation from the NATMAC distribution list
Association of Remotely Piloted Aircraft Systems UK (ARPAS-UK)	Relevant organisation from the NATMAC distribution list
Aviation Environment Federation (AEF)	Relevant organisation from the NATMAC distribution list
British Airways (BA)	Relevant organisation from the NATMAC distribution list

British Airline Pilots Association (BALPA)	Relevant organisation from the NATMAC distribution list
British Balloon and Airship Club	Relevant organisation from the NATMAC distribution list
British Business and General Aviation Association (BBGA)	Relevant organisation from the NATMAC distribution list
British Gliding Association (BGA)	Relevant organisation from the NATMAC distribution list
British Helicopter Association (BHA)	Relevant organisation from the NATMAC distribution list
British Hang Gliding and Paragliding Association (BHPA)	Relevant organisation from the NATMAC distribution list
British Microlight Aircraft Association (BMAA) / General Aviation Safety Council (GASCo)	Relevant organisation from the NATMAC distribution list
British Model Flying Association (BMFA)	Relevant organisation from the NATMAC distribution list
British Skydiving	Relevant organisation from the NATMAC distribution list
Drone Major	Relevant organisation from the NATMAC distribution list
General Aviation Alliance (GAA)	Relevant organisation from the NATMAC distribution list
Guild of Air Traffic Control Officers (GATCO)	Relevant organisation from the NATMAC distribution list
Honourable Company of Air Pilots (HCAP)	Relevant organisation from the NATMAC distribution list
Helicopter Club of Great Britain (HCGB)	Relevant organisation from the NATMAC distribution list
Heavy Airlines	Relevant organisation from the NATMAC distribution list
Iprosurv	Relevant organisation from the NATMAC distribution list
Isle of Man CAA	Relevant organisation from the NATMAC distribution list
Light Aircraft Association (LAA)	Relevant organisation from the NATMAC distribution list
Low Fare Airlines	Relevant organisation from the NATMAC distribution list
MoD – DAATM	Relevant organisation from the NATMAC distribution list
PPL/ IR (Europe)	Relevant organisation from the NATMAC distribution list
UK Airprox Board (UKAB)	Relevant organisation from the NATMAC distribution list
UK Flight Safety Committee (UKFSC)	Relevant organisation from the NATMAC distribution list

9. Annex B: Glossary

ACOG	Airspace Change Organising Group	ACOG's role is to coordinate the delivery of key aspects of the UK Government's Airspace Modernisation Strategy
ACP	Airspace Change Proposal	An Airspace Change Proposal is a request from a 'change sponsor', usually an airport or a provider of air navigation services (including air traffic control), to change the notified airspace design
agl	Above Ground Level	Vertical distance with reference to the ground.
AIP	Aeronautical Information Publication	A publication issued by or with the authority of a state and containing aeronautical information of a lasting character essential to air navigation.
AMP	Airspace Masterplan	The Masterplan identifies where airspace changes are needed to support the delivery of the Airspace Modernisation Strategy.
AMS	Airspace Modernisation Strategy	The strategy sets out the ends, ways and means of modernising airspace
ANSP	Air Navigation Service Provider	An Air Navigation Service Provider is an organisation that provides the service of managing the aircraft in flight or on the manoeuvring area of an airfield and which is the legitimate holder of that responsibility.
AONB	Area of Outstanding Natural Beauty	An Area of Outstanding Natural Beauty is a designated exceptional landscape whose distinctive character and natural beauty are precious enough to be safeguarded in the national interest.
ATC	Air Traffic Control	Air traffic control is a service provided by ground-based air traffic controllers who direct aircraft on the ground and through a given section of controlled airspace and can provide advisory services to aircraft in non-controlled airspace.
ATCO	Air Traffic Control Officer	Air traffic Control Officers are personnel responsible for the safe, orderly, and expeditious flow of air traffic in the global air traffic control system
ATS	Air Traffic Services	An air traffic service (ATS) is a service which regulates and assists aircraft in real-time to ensure their safe operations.
BGA	British Gliding Association	The governing body for the sport of gliding in the UK.
CAA	Civil Aviation Authority	The Civil Aviation Authority oversees and regulates all aspects of civil aviation in the United Kingdom.

CAP1385	CAA Performance-based Navigation (PBN): Enhanced Route Spacing Guidance	Guidelines for the spacing requirements of UK ATS routes
CAP1616	CAA Airspace Change Process	The CAA's guidance on the regulatory process for changing the notified airspace design and planned and permanent redistribution of air traffic.
CAP1711	CAA Airspace Modernisation Strategy	See AMS.
CAS	Controlled Airspace	Generic term for the airspace in which an air traffic control service is provided as standard; note that there are different sub classifications of airspace that define the particular air traffic services available in defined classes of controlled airspace.
CCO	Continuous Climb Operations	Continuous Climb Operations is an aircraft operating technique facilitated by the airspace and procedures design and assisted by appropriate ATC procedures, allowing the execution of a flight profile optimised to the performance of aircraft, leading to significant economy of fuel and environmental benefits in terms of noise and emissions reduction.
CDO	Continuous Descent Operations	Continuous Descent Operations is an aircraft operating technique in which an arriving aircraft descends from an optimal position with minimum thrust and avoids level flight to the extent permitted by the safe operation of the aircraft and compliance with published procedures and ATC instructions.
CDR	Conditional Route	A Conditional Route is defined as non-permanent ATS route or portion thereof which can be planned and used under specified conditions.
CO_2	Carbon Dioxide	A greenhouse gas produced by burning aviation fuel.
CTA	Control Area	A control area is a Controlled Airspace extending upwards from a specified limit above the earth.
DAATM	Defence Airspace Air Traffic Management	The DAATM is the MoD focal point for all Defence Airspace policy, including airspace related to the UK Low Flying.
DCT	Direct	(Direct) Waypoint to waypoint routing, which does not use an airway. DCT's are published in the RAD appendix 4
DfT	Department for Transport	The Department for Transport is the United Kingdom government department responsible for the English transport network and a limited number of transport matters in

		Scotland, Wales and Northern Ireland that have not been devolved.
DP	Design Principle	The design principles encompass the safety, environmental and operational criteria and strategic policy objectives that the change sponsor aims for in developing the airspace change proposal.
DVOR	Doppler VHF Omnidirectional Range	A Dopler VHF Omnidirectional Range is a ground based Navigation Aid that allows the airborne receiving equipment to derive the magnetic bearing from the station to the aircraft.
EGPD	Aberdeen Airport	ICAO code for Aberdeen Airport
EGPF	Glasgow Airport	ICAO code for Glasgow Airport
EGPG	Cumbernauld Airport	ICAO code for Cumbernauld Airport
EGPH	Edinburgh Airport	ICAO code for Edinburgh Airport
EGPK	Prestwick Airport	ICAO code for Prestwick Airport
EGPN	Dundee Airport	ICAO code for Dundee Airport
FAS	Future Airspace Strategy	A forerunner of the AMS
FASI-N	Future Airspace Strategy Implementation North	An airspace project modernising airspace in the north of the UK
FIR	Flight Information Region	Flight Information Region (Airspace below FL255)
FL	Flight Level	A flight level (FL) is an aircraft's altitude at standard air pressure (1013 hPa), expressed in hundreds of feet.
FLOPSC	Flight Operations Performance and Safety Committee	An Airports FLOPSC is a committee that deals with the aspects impacting the flight and operational safety at the airport and includes base captain representation for the fleets.
FRA	Free Route Airspace	Free route airspace (FRA) is a specified airspace within which users may freely plan a route between a defined entry point and a defined exit point.
ft	feet	The standard measure for vertical distances used in air traffic control
GA	General Aviation	All civil aviation operations other than scheduled air services and non-scheduled air transport operations for remuneration or hire. The most common type of GA activity is recreational flying by private light aircraft and gliders, but it can range from

		paragliders and parachutists to microlights and private corporate jet flights.
GB-0180	Strathaven Airfield	ICAO Designator for Strathaven Airfield
HoA	Head of Airspace	
hPa	Hectopascal	The Hectopascal is the international unit for measuring atmospheric or barometric pressure.
IFP	Instrument Flight Rules	Instrument Flight Rules are rules which allow properly equipped aircraft to be flown under instrument meteorological conditions.
kg	Kilogram	The kilogram is the international unit for measuring mass.
LAA	Light Aircraft Association	A NATMAC member representing Light Aircraft users
LAC	London Area Control	The unit which manages the en-route traffic in the London Flight Information Region. This includes en-route airspace over England and Wales up to the Scottish border.
LOCP	Lead Operator Carrier Panel	A group of the lead operators within UK airspace
MoD	Ministry of Defence	
MTMA	Manchester TMA	TMA surrounding the Manchester group airports
NATS	UK ANSP	The UK's licenced air traffic service provider for the en route airspace that connects our airports with each other, and with the airspace of neighbouring states. Also the air navigation service provider at various UK Airports.
NavAid	Ground Based Navigation Aid	Published Navigation aid used by aviation.
NERL	NATS En-route Ltd.	See NATS
NM	Nautical Mile	Aviation measures distances in nautical miles. One nautical mile (nm) is 1,852 metres. One road mile ('statute mile') is 1,609 metres, making a nautical mile about 15% longer than a statute mile.
NSA	National Scenic Area	A National Scenic Area is an area designated in Scotland as having outstanding scenic value in a national context
OAC	Oceanic Area Control	The unit which manages the en-route traffic within Oceanic Flight Information Region.
PBN	Performance Based Navigation	Performance Based Navigation is a generic term for modern standards for aircraft navigation capabilities including satellite

		navigation (as opposed to 'conventional' navigation standards).
RAD	Route Availability Document	The Route Availability Document is a flight-planning document.
RC	Radar Corridor	Radar Corridors are routes that allow aircraft to cross controlled airspace with minimum disturbance to controllers and other aircraft.
ScAC	Scottish Area Control	The unit which manages the en-route traffic within the Scottish Flight Information Region.
ScTMA	Scottish Terminal Manoeuvring Area	TMA surrounding the Scottish group airports
SFC	Surface	Ground level
SID	Standard Instrument Departure	A Standard Instrument Departure is a published route with climb for aircraft to follow straight after take-off
SME	Subject Matter Expert	A subject-matter expert is a person who is an authority in a particular area or topic.
SoN	Statement of Need	The Statement of Need sets out what issue or opportunity an airspace change seeks to address.
SPIG	Safety Performance Improvement Group	A group of SMEs who asses the overall safety and operational implications of changes.
STAR	Standard Arrival Route	A Standard Terminal Arrival Route is a published route for arriving traffic. In today's system these bring aircraft from the route network to the holds (some distance from the airport at high levels), from where they follow ATC instructions (see Vector) rather than a published route. Under PBN it is possible to connect the STAR to the runway via a Transition.
TA	Transition Altitude	The Transition Altitude is the altitude at or below which the vertical position of an aircraft is controlled by reference to altitudes.
TMA	Terminal Manoeuvring Area	A Terminal Manoeuvring Area is a Control Area normally established at the confluence of ATS Routes in the vicinity of one or more major aerodromes.
UIR	Upper Information Region	Upper Information Region (Airspace above FL255)
NATMAC	National Air Traffic Management Advisory Committee	A group of organisations representing various users of the UK Airspace

10. Annex C: Stakeholder Engagement Invites

10.1 ACOG invite to NERL for ScTMA Deployment Coordination Meeting (10/06/2021)

-----Original Appointment-----
From: [redacted]
Sent: 21 May 2021 10:46
To: [redacted]
Cc: [redacted]
Subject: ScTMA Deployment Programme Coordination Group
When: 10 June 2021 11:00-12:30 (UTC+00:00) Dublin, Edinburgh, Lisbon, London.
Where: Microsoft Teams Meeting

Mimecast Attachment Protection has deemed this file to be safe, but always exercise caution when opening files.

As both sponsor ACPs are progressing now, I thought it would be useful to bring this meeting forward to gain momentum sooner.

Dear all

This is the first meeting for this group. As such we will follow the standard agenda as below.

Please forward to members of your team who are best placed to provide programmatic updates. This is not a technical airspace design meeting.

1. Actions review
2. Update from ACOG – overview of deployment
3. Individual Sponsor updates:
   - ACP progress
   - Critical path to the next Gate
   - Identify any concerns, risk or opportunities.

   a. Edinburgh
   b. Glasgow
   c. Aberdeen
   d. NERL

4. Meetings:
   - Forecast for the next 2 months
   - Additional meetings required.

5. Future planning

Thanks

[redacted]

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10.2 ACOG invite to NERL for ScTMA Tech Coordination Meeting (03/08/2021)

-----Original Appointment-----
From: [redacted]
Sent: 15 June 2021 16:16
To: [redacted]
Cc: [redacted]
Subject: ScTMA Technical Coordination & Design Development Group
When: 03 August 2021 13:00-15:00 (UTC+00:00) Dublin, Edinburgh, Lisbon, London.
Where: Microsoft Teams Meeting

Mimecast Attachment Protection has deemed this file to be safe, but always exercise caution when opening files.

Hi All,

This is the monthly meeting to discuss technical coordination and engagement requirements within the ScTMA deployment group and to facilitate the collaborative design development workshops. I have updated the terms of reference for the group which we can finalise at the first meeting. I look forward to restarting the technical development and engagement.

Regards, [redacted]

Microsoft Teams meeting

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10.3 ACOG invite to NERL for ScTMA Deployment Coordination Meeting (09/08/2021)

-----Original Appointment-----
From: [redacted]
Sent: 10 June 2021 13:08
To: [redacted]
Cc: [redacted]
Subject: ScTMA Deployment Programme Coordination Group
When: 09 August 2021 11:00-12:30 (UTC+00:00) Dublin, Edinburgh, Lisbon, London.
Where: Microsoft Teams Meeting

Mimecast Attachment Protection has deemed this file to be safe, but always exercise caution when opening files.

Hello all,

After our introductions and update last time and in response to Fiona's recent request, I feel we could use this second programme session to begin to understand the detail of Stage 2 as a deployment group and associated key milestones, areas of collaboration and additional requirements in order to achieve the next gate.

As such, the main element of this meeting will be focussed on this topic. Please come prepared with your individual project plans, if available, to allow us to compare and align where possible.

Minutes from the last meeting attached.

Agenda:

1. Actions from previous meeting
2. Update from ACOG
3. Update from Sponsors
4. As above – understanding detail of Stage 2
5. AOB

Kind regards

[redacted]

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10.4 Edinburgh invite to NERL, Glasgow airport and ACOG to discuss early options (10/08/2021)

-----Original Appointment-----
From: [redacted]
Sent: 09 July 2021 11:35
To: [redacted]
Subject: Stage 2 GLA/EDI options workshop
When: 10 August 2021 10:00-16:00 (UTC+00:00) Dublin, Edinburgh, Lisbon, London.
Where: Microsoft Teams Meeting

A workshop to discuss Stage 2 interdependencies and flight path options selection and appraisal.
Please invite others as you see fit.
I hope to produce an agenda in advance and if possible get some of us into a meeting room as opposed to this being entirely on line.
Thanks
[redacted]

Microsoft Teams meeting

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10.5 NERL invite to MoD to discuss option viability (01/09/2021)

-----Original Appointment-----
From: [redacted]
Sent: 17 August 2021 15:21
To: [redacted]
Cc: [redacted]
Subject: ScTMA/Military initial engagement meeting
When: 01 September 2021 11:00-12:00 (UTC+00:00) Dublin, Edinburgh, Lisbon, London.
Where: Microsoft Teams Meeting

Hi,

This is an initial engagement meeting between Prestwick and Military stakeholders to discuss the viability of early options.

Look forward to meeting with you.

[redacted]

____

Microsoft Teams meeting

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Or call in (audio only)

[redacted] United Kingdom, London

Phone Conference ID: [redacted]

Find a local number | Reset PIN

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10.6 ACOG invite to NERL for ScTMA Tech Coordination Meeting (07/09/2021)

Subject: Copy: ScTMA Technical Coordination Group Meeting
Location: Swanwick 2207-018 Desk

Start: Tue 07/09/2021 13:00
End: Tue 07/09/2021 15:00

Recurrence: (none)

Meeting Status: Not yet responded

Organizer: [redacted]

Categories: ACOG

Mimecast Attachment Protection has deemed this file to be safe, but always exercise caution when opening files.

Hi All,

I've updated the invite list based on the attendees from the last meeting. As we go along we can amend and update the attendees.

Regards, [redacted]

Microsoft Teams meeting

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Click here to join the meeting

Learn More | Meeting options

10.7 NERL invite to ScTMA Workshop 1 (28/09/2021)

Original Appointment-----
From: [redacted]
Sent: 08 September 2021 14:30
To: [redacted]
Cc: [redacted]
Subject: ScTMA workshop 1
When: 28 September 2021 9:00-16:00 (UTC+00:00) Dublin, Edinburgh, Lisbon, London.
Where: Microsoft Teams Meeting

Invitation 1 of 3

Good afternoon,

This is the first of three workshops to initiate the ScTMA redesign ACP.

We would like you to attend, if your schedules allow.

Please can I make the following request of the airports: Can you please arrange for an approach controller to be made available to attend each workshop as their SME input will be invaluable.

Many thanks

We look forward to seeing you

Regards
[redacted]

Microsoft Teams meeting
Join on your computer or mobile app
Click here to join the meeting
Or call in (audio only)
[redacted] United Kingdom, London
Phone Conference ID: [redacted]
Find a local number | Reset PIN
Learn More | Meeting options

10.8 NERL invite to ScTMA Workshop 2 (30/09/2021)

-----Original Appointment-----
From: [redacted]
Sent: 08 September 2021 14:31
To: [redacted]
Cc: [redacted]
Subject: ScTMA Workshop 2
When: 30 September 2021 9:00-16:00 (UTC+00:00) Dublin, Edinburgh, Lisbon, London.
Where: Microsoft Teams Meeting

Invitation 2 of 3

Good afternoon,

This is the second of three workshops to initiate the ScTMA redesign ACP.

We would like you to attend, if your schedules allow.

Please can I make the following request of the airports: Can you please arrange for an approach controller to be made available to attend each workshop as their SME input will be invaluable.

Many thanks

We look forward to seeing you

Regards
[redacted]

____

Microsoft Teams meeting

Join on your computer or mobile app
Click here to join the meeting
Or call in (audio only)
[redacted] United Kingdom, London
Phone Conference ID: [redacted]
Find a local number | Reset PIN
Learn More | Meeting options

____

10.9 NERL invite to ScTMA Workshop 3 (01/10/2021)

Original Appointment-----
From: [redacted]
Sent: 08 September 2021 14:31
To: [redacted]
Subject: ScTMA Workshop 3
When: 01 October 2021 09:00-16:00 (UTC+00:00) Dublin, Edinburgh, Lisbon, London.
Where: Microsoft Teams Meeting

Invitation 3 of 3

Good afternoon,

This is the third of three workshops to initiate the ScTMA redesign ACP.

We would like you to attend, if your schedules allow.

Please can I make the following request of the airports: Can you please arrange for an approach controller to be made available to attend each workshop as their SME input will be invaluable.

Many thanks

We look forward to seeing you

Regards
[redacted]

Microsoft Teams meeting
Join on your computer or mobile app
Click here to join the meeting
Or call in (audio only)
[redacted] United Kingdom, London
Phone Conference ID: [redacted]
Find a local number | Reset PIN
Learn More | Meeting options

10.10 ACOG invite to NERL, Edinburgh and Glasgow airports to discuss Glasgow Design Options (05/10/2021)

-----Original Appointment-----
From: [redacted]
Sent: 13 September 2021 11:39
To: [redacted]
Cc: [redacted]
Subject: ScTMA - Placeholder for detailed planning - afternoon session
When: 05 October 2021 13:00-15:30 (UTC+00:00) Dublin, Edinburgh, Lisbon, London.
Where: Microsoft Teams Meeting

Dear all,

As per the action from the last meeting – these sessions will be going into detail in relation to the activities linked to the ScTMA Stage 2/3 work and the dependencies we will track going forwards

I will keep this all in two Teams meetings – one for the morning and a second for the afternoon. Please can you identify who will be coming to each of the sessions and forward the invitation onto them (and let me know who to expect to attend).

Thanks

[redacted]

Microsoft Teams meeting
Join on your computer or mobile app
Click here to join the meeting
Learn More | Meeting options

10.11 NERL invite to Point Merge Discussion (2/11/2021)

-----Original Appointment-----
From: [redacted]
Sent: 01 October 2021 09:58
To: [redacted]
Cc: [redacted]
Subject: Point Merge Fundamentals - Technical Workshop
When: 02 November 2021 09:00-11:00 (UTC+00:00) Dublin, Edinburgh, Lisbon, London.
Where: Microsoft Teams Meeting

A Meeting to evaluate Point Merge technical considerations supported by appropriate analytical modelling(NERL) with regard to potential suitability in the ScTMA.

Microsoft Teams meeting
Join on your computer or mobile app
Click here to join the meeting
Learn More | Meeting options

10.12 ACOG invite to NERL, Edinburgh and Glasgow airports to discuss Glasgow Design Options (05/11/2021)

Original Appointment-----
From: [redacted]
Sent: 05 October 2021 12:22
To: [redacted]
Cc: [redacted]
Subject: ScTMA Edinburgh / Glasgow options show and tell (Part 2)
When: 05 November 2021 09:00-12:00 (UTC+00:00) Dublin, Edinburgh, Lisbon, London.
Where: Microsoft Teams Meeting

Additional 30 mins added at the request of EDI / GLA for airport only discussion, all other attendees to leave at 2pm

Hi All,

Hello please feel free to forward this invite to anybody who I may have missed.

Agenda:

- Introductions if required
- EDI design objectives and Options
- GLA design objectives and Options (re-cap if needed)
- Discussion
- AOB
- Airport only discussion

We look forward to seeing you on the 14th
Kind Regards David

ACOG

[redacted]
ATM Specialist

Airspace Change Organising Group
4000 Parkway, Whiteley
Fareham, Hampshire, PO15 7FL

e
m: [redacted]

Microsoft Teams meeting

Join on your computer or mobile app
Click here to join the meeting
Learn More | Meeting options

10.13 ACOG invite to NERL for ScTMA Deployment Coordination Meeting (09/11/2021)

Subject:	ScTMA Programme Coordination Group
Location:	Microsoft Teams Meeting
Start:	Tue 09/11/2021 10:00
End:	Tue 09/11/2021 11:30
Recurrence:	(none)
Meeting Status:	Accepted
Organizer:	[redacted]
Categories:	Important

Mimecast Attachment Protection has deemed this file to be safe, but always exercise caution when opening files.

Hi All,

Minutes from the last meeting and stage 2 detailed excel attached.

Agenda:

1. Actions from previous meeting – Action Tracker - FASI-N ScTMA
2. Update from ACOG
3. Update from Sponsors – progress on stage 2 deliverables and dependencies
4. AOB

Kind regards

[redacted]

Microsoft Teams meeting

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Click here to join the meeting

Learn More | Meeting options

10.14 NERL invite to EGPH and EGPF to Discus NERL Long list of Options (17/11/2021)

-----Original Appointment-----
From: [redacted]
Sent: 05 October 2021 14:27
To: [redacted]
Cc: [redacted]
Subject: NERL Long List Options review - placeholder
When: 17 November 2021 09:00-15:00 (UTC+00:00) Dublin, Edinburgh, Lisbon, London.
Where: Microsoft Teams Meeting

Hi all – placeholder for a NERL long list options review, I've made it a full day as a placeholder for now but potentially it could be trimmed to ½ or 2/3 dependent upon our external colleagues availability and pressures on everyone's time. Kel has kindly confirmed attendance in conversation with me just now.

Please forward as appropriate .

Many thanks,

[redacted]

____

Microsoft Teams meeting

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____

10.15 Glasgow invitation to NERL to present their design options (01/12/2021)

From: [redacted]
Sent: 28 October 2021 12:33
To: [redacted]
Subject: Glasgow Airport invites you to attend a briefing session on its Airspace Change Proposal

Your attachments have been security checked by Mimecast Attachment Protection. Files where no threat or malware was detected are attached.

Dear [redacted]

Glasgow Airport invites you to attend a briefing session on its Airspace Change Proposal

Following our recent correspondence, I am emailing to invite you to a briefing session about the next stage in Glasgow Airport's Airspace Change Proposal (ACP) – a UK-wide initiative to modernise the country's airspace, known as the Airspace Modernisation Strategy (AMS). You can register to attend a session at https://glasgowairport.consultationonline.co.uk/register-for-workshop/.

Background

Glasgow Airport, along with other airports in Scotland, is required by the Department for Transport (DfT) and Civil Aviation Authority (CAA) to review the departure and arrival routes and surrounding airspace of the airport. The regulatory requirements and guidance for this process is known as CAP1616.

In 2019 Glasgow Airport commenced Stage 1 of the CAP1616 process, which included engaging with a range of stakeholders and community representatives on the principles that should guide the airport's decision making when it comes to designing any new routes. The final Design Principles can be viewed here.

Next steps

Glasgow Airport has successfully passed Stage 1 of the ACP process and has now commenced Stage 2. This stage involves developing a comprehensive list of potential airspace change design options.

To continue to engage effectively with those stakeholders that were involved in Stage 1, Glasgow Airport is hosting stakeholder briefing sessions. The aim of these sessions is to gain feedback from stakeholders about Glasgow Airport's process for developing its design options. Specifically, stakeholders will be asked to consider if Glasgow Airport has taken full account of the Stage 1 Design Principles.

Attend one of our briefing sessions

We ask that your organisation select **one representative** to attend one of the following briefing sessions:

Date: Thursday 25th November 2021
Time: 11am to 1:30pm
At: Online

- Or -

Date: Wednesday 1st December 2021
Time: 2pm to 4:30pm

10.16 NERL invite to Edinburgh and Glasgow Airports to follow up point merge meeting 2/11/2021 (06/12/2021)

Original Appointment-----
From: [redacted]
Sent: 02 November 2021 12:23
To: [redacted]
Subject: ScTMA Point Merge Rationale Discussion
When: 06 December 2021 14:00-16:00 (UTC+00:00) Dublin, Edinburgh, Lisbon, London.
Where: Microsoft Teams Meeting

Follow up meeting from 2nd November Point Merge Fundamentals Technical discussion:-

To review suitability of Point Merge (s) arrival structures in ScTMA design concepts.
To include revisiting to each sponsors Design Principles, debate any rationale/ benefit/disbenefit/ opinion narrative each sponsor may be in a position to provide at this point as to suitability of Point Merge concepts within each sponsor's Con Ops.

Many thanks,

[redacted]

____

Microsoft Teams meeting

Join on your computer or mobile app
Click here to join the meeting
Learn More | Meeting options
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10.17 ACOG invite to NERL for ScTMA Tech Coordination Meeting (07/12/2021)

Due to technical reasons, it has not been possible to submit the meeting invite as evidence. However, Meeting Minutes confirming attendance have been supplied to the CAA.

10.18 NERL invite to LOCP (08/12/2021)

-----Original Appointment-----
From: [redacted]
Sent: 28 June 2021 10:00
To: [redacted]
Cc: [redacted]
Subject: Lead Operator Carrier Panel #16 - Day 2
When: 08 December 2021 13:00-15:30 (UTC+00:00) Dublin, Edinburgh, Lisbon, London.
Where: Microsoft Teams Meeting

Please note timing correction below (in bold)

Dear Carrier Panel members

In follow-up to the Doodle Poll, Carrier Panel Review #16 will be held at **13:00-15:30 UTC** on both Tuesday 7th and Wednesday 8th December.

The Agenda will be finalised and circulated nearer the time. As per usual, I will try to get this out around one month in advance of the meeting.
In the meantime, please remember that any member of the group is welcome to propose or request specific topics.

The outline format:
1. High-level updates on NATS major airspace projects, with review at a detailed level on specific items.
2. Analysis, technical or regulatory viewpoint from any member of the Carrier Panel
3. Update on activities by the Technical Group.

Regards,
[redacted]

____

10.19 NERL invite to MoD to discus NERL long list of Options (09/12/2021)

Original Appointment-----
From: [redacted]
Sent: 08 November 2021 11:43
To: [redacted]
Cc: [redacted]
Subject: NATS ScTMA ACP & Mil ACP Update.
When: 09 December 2021 11:00-12:15 (UTC+00:00) Dublin, Edinburgh, Lisbon, London.
Where: Microsoft Teams Meeting

Good morning everyone,

I'd like to invite you to the next of our NATS ScTMA - Military engagement sessions (via Teams) to review concept development/progress within each of our ACP'S since we last met back in September. Please give me shout if this isn't a convenient time as without visibility to external colleagues calendars these things are always a bit of a random hit, do feel free suggest alternative dates & times.

Many thanks,

[redacted]

[redacted]
Airspace Engagement

Work: [redacted]
E: [redacted]

Swanwick Centre
Sopwith Way
Swanwick
Hants
SO31 7AY

NATS PRIVATE

10.20 Dundee airport invite to NERL to present ScTMA long list options to EGPN FLOPSC (13/12/2021)

Subject: Copy: Dundee Airport Operators Forum
Location: Microsoft Teams Meeting

Start: Mon 13/12/2021 11:00
End: Mon 13/12/2021 13:00
Show Time As: Tentative

Recurrence: (none)

Meeting Status: Not yet responded

Organizer: [redacted]

Good morning all,

The next Dundee Airport Operators Forum is scheduled for December 13th 2021 at 11:00. Due to current restrictions the forum will take place as a Conference Call. Microsoft Teams meeting details are listed below and previous minutes, action items and agenda are attached.

Join on your computer or mobile app

Click here to join the meeting

Microsoft Teams meeting

Join on your computer or mobile app
Click here to join the meeting

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Learn More | Meeting options | Legal

10.21 Edinburgh Airport invite to NERL to present ScTMA long list options to EGPH FLOPSC (10/01/2022)

-----Original Appointment-----
From: [redacted]
Sent: 18 November 2021 10:14
To: [redacted]
Cc: [redacted]
Subject: FLOPSC
When: 10 January 2022 13:30-15:30 (UTC+00:00) Dublin, Edinburgh, Lisbon, London.
Where: Microsoft Teams Meeting

Confirming this meeting will be held via Teams.

We will review holding this meeting in person at a later date.

Best regards,
[redacted]

Microsoft Teams meeting

Join on your computer or mobile app
Click here to join the meeting
Learn More | Meeting options

10.22 ACOG invite to NERL for ScTMA Deployment Coordination Meeting (18/01/2022)

Subject:	ScTMA Programme Coordination group
Location:	Microsoft Teams Meeting
Start:	Tue 18/01/2022 10:00
End:	Tue 18/01/2022 11:30
Recurrence:	(none)
Meeting Status:	Accepted
Organizer:	[redacted]
Categories:	TMA Definition

Mimecast Attachment Protection has deemed this file to be safe, but always exercise caution when opening files.

Hi All,

Minutes from the last meeting and stage 2 detailed excel attached.

Agenda:

1. Actions from previous meeting – Action Tracker - FASI-N ScTMA
2. Update from ACOG
3. Update from Sponsors – progress on stage 2 deliverables and dependencies
4. AOB

Kind regards

[redacted]

Microsoft Teams meeting

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Click here to join the meeting

Learn More | Meeting options

10.23 NERL invite to MoD to provide further support to Stage 2 Feedback (18/01/2021)

-----Original Appointment-----
From: [redacted]
Sent: 09 December 2021 15:19
To: [redacted]
Cc: [redacted]
Subject: NERL ScTMA Project -Mil Catch Up
When: 18 January 2022 11:00-12:00 (UTC+00:00) Dublin, Edinburgh, Lisbon, London.
Where: Microsoft Teams Meeting

A chance for us to catch up 6 weeks since our 9th Dec Longlist Options Teams Meeting.

Please feel free to suggest alternate dates and times.

Many thanks,

[redacted]

Microsoft Teams meeting
Join on your computer or mobile app
Click here to join the meeting
Join with a video conferencing device
natsglobal@m.webex.com
Video Conference ID: 126 932 911 2
Alternate VTC instructions
Learn More | Meeting options

10.24 NERL invite to Edinburgh and Glasgow Airports to review Visualisations Simulations Phase 1 (28/01/2022)

-----Original Appointment-----
From: [redacted]
Sent: 18 January 2022 09:06
To: [redacted]
Cc: [redacted]
Subject: ScTMA vis sim Playbacks
When: 28 January 2022 10:30-11:30 (UTC+00:00) Dublin, Edinburgh, Lisbon, London.
Where: Microsoft Teams Meeting

Good morning everyone,

You may see in your inbox an invite for this meeting on 27th January but due to some calendar clashes I've just cancelled that, here is a new invite for the 28th Jan to look at these instead.

Through the creative use of Teams and laptop camera(s), we'd like to show the concepts we have been running in Prestwick Space during phase 1 of the vis sims which you would have seen with us in the building had Covid rules not disrupted things.

Many thanks,

[redacted]

Microsoft Teams meeting
Join on your computer or mobile app
Click here to join the meeting
Join with a video conferencing device
natsglobal@m.webex.com
Video Conference ID: 129 378 716 5
Alternate VTC instructions
Learn More | Meeting options

10.25 NERL invite to Edinburgh and Glasgow Airports to Plan Visualisations Simulations Phase 2 (04/02/2022)

Original Appointment-----
From: [redacted]
Sent: 16 November 2021 15:07
To: [redacted]
Cc: [redacted]
Subject: ScTMA Visualisation Simulations phase 1 Technical Review
When: 04 February 2022 10:00-12:00 (UTC+00:00) Dublin, Edinburgh, Lisbon, London.
Where: Microsoft Teams Meeting

A 2 hour meeting to jointly review output captured during the phase ScTMA vis sims (11th to 28th Jan) to inform & further refine the phase 2 simulation program (14th Feb to 4th March). Please forward this invite within your organisation as appropriate.

Many thanks,

[redacted]

NATS
[redacted]
Airspace Engagement

Work: [redacted]
E: [redacted]

Swanwick Centre
Sopwith Way
Swanwick
Hants
SO31 7AY

NATS PRIVATE

Microsoft Teams meeting
Join on your computer or mobile app
Click here to join the meeting
Join with a video conferencing device
natsglobal@m.webex.com
Video Conference ID: [redacted]
Alternate VTC instructions
Learn More | Meeting options

10.26 NERL invite to Edinburgh and Glasgow Airports to Plan Visualisations Simulations Phase 2 (07/02/2022)

From: [redacted]
Sent: 31 January 2022 12:20
To: [redacted]
Cc: [redacted]
Subject: SCTMA Vis Sim Review
When: 07 February 2022 11:00-12:30 (UTC+00:00) Dublin, Edinburgh, Lisbon, London.
Where: Microsoft Teams Meeting

All

A second meeting to review the recordings from the vis sims to gain feedback from airport approach controllers, following [redacted] request.

I have my TRUCE session , however, will leave this in the hands of [redacted] to run the meeting.

Regards

[redacted]

Microsoft Teams meeting

Join on your computer or mobile app

Click here to join the meeting

Join with a video conferencing device

natsglobal@m.webex.com

Video Conference ID: [redacted]

Alternate VTC instructions

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10.27 NERL invite to BGA, LAA and Edinburgh Airport to Discuss the NERL Long list of Options (08/02/2022)

-----Original Appointment-----
From: [redacted]
Sent: 05 January 2022 13:30
To: [redacted]
Cc: [redacted]
Subject: BGA - Edinburgh Airport - NATS Engagement: Understanding Gliding within Scottish Airspace Modernisation.
When: 08 February 2022 14:00-15:30 (UTC+00:00) Dublin, Edinburgh, Lisbon, London.
Where: Microsoft Teams Meeting

Microsoft Teams meeting

Join on your computer or mobile app
Click here to join the meeting
Join with a video conferencing device
[redacted]
Video Conference ID: [redacted]
Alternate VTC instructions
Learn More | Meeting options

10.28 NERL invite to Glasgow Prestwick Airport to discuss NERL long list options (10/02/2022)

-----Original Appointment-----
From: [redacted]
Sent: 19 January 2022 10:09
To: [redacted]
Cc: [redacted]
Subject: NERL - Prestwick ScTMA Airspace Modernisation Stage 2 Engagement Invitation
When: 10 February 2022 10:00-11:15 (UTC+00:00) Dublin, Edinburgh, Lisbon, London.
Where: Microsoft Teams Meeting

Good morning ,

As you may know during the COVID pandemic NERL paused its ScTMA Airspace Modernisation ACP's, as did most stakeholders in the FASI North and South Programs. I'm delighted to say that we have recently restarted this work and as a stakeholder in our ACPS's, we would like to invite you to an online Teams Stage 2 Engagement session 11th Feb 1000-1115 . During the session we will introduce the NERL team, present where we are in the ACP process, our corresponding long list design options at this point and also request your feedback in due course.

Please feel free to forward this invite as appropriate within your organisation but in the meantime if you have any questions or seek an alternative date/time, please don't hesitate to contact me.

We look forward to seeing you.

Best regards,

[redacted]

NATS
[redacted]
Airspace Engagement

Work: [redacted]
E: [redacted]

Swanwick Centre
Sop with Way
Swanwick
Hants
SO31 7AY

10.29 NERL invite to BaE Warton to discuss NERL long list options (11/02/2022)

-----Original Appointment-----
From: [redacted]
Sent: 28 January 2022 15:25
To: [redacted]
Cc: [redacted]
Subject: ScTMA NERL Stage 2 ACP Update
When: 11 February 2022 10:00-11:00 (UTC+00:00) Dublin, Edinburgh, Lisbon, London.
Where: Microsoft Teams Meeting

[redacted]

An updated date/ time, hope this suits?

Thanks

[redacted]

NATS

[redacted]

Airspace Implementation Manager

Prestwick Centre

D: [redacted]
M:
E:

4000 Parkway, Whiteley,
Fareham, Hants PO15 7FL
www.nats.co.uk

10.30 NERL invite to Edinburgh and Glasgow Airports to Discuss Timebound SIDs (11/02/2022)

Original Appointment-----
From: [redacted]
Sent: 02 February 2022 12:11
To: [redacted]
Subject: Timebound SIDS discussion
When: 11 February 2022 11:00-12:00 (UTC+00:00) Dublin, Edinburgh, Lisbon, London.
Where: Microsoft Teams Meeting

Re the email thread over the past couple days gents – an hour slot to talk about time bound SIDS as requested. Alternative dates & times are a bit thin on the ground in the next couple of weeks but if its an absolute no can do for anyone please let me know, forward as appropriate as always.

Many thanks,

[redacted]

Microsoft Teams meeting

Join on your computer or mobile app
Click here to join the meeting
Join with a video conferencing device
[redacted]
Video Conference ID: [redacted]
Alternate VTC instructions
Learn More | Meeting options

Zoom

10.31 NERL invite to Edinburgh Airport to clarify EGPH feedback to NERL options (23/02/2021)

-----Original Appointment-----
From: [redacted]
Sent: 17 February 2022 13:46
To: [redacted]
Subject: Catch Up Edinburgh - NERL stage 2 Long List Feedback
When: 23 February 2022 12:30-13:00 (UTC+00:00) Dublin, Edinburgh, Lisbon, London.
Where: Microsoft Teams Meeting

Thanks to Simon for offering this in his diary - Quick catch up as discussed to run through feedback.

Cheers ,

[redacted]

Microsoft Teams meeting

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Click here to join the meeting
Join with a video conferencing device
[redacted]
Video Conference ID: [redacted]
Alternate VTC instructions
Learn More | Meeting options

10.32 NERL invite to Prestwick SPIG (08/03/2022)

-----Original Appointment-----
From: [redacted]
Sent: 05 March 2022 19:08
To: [redacted]
Cc: [redacted]
Subject: SPIG
When: 08 March 2022 09:00-10:00 (UTC+00:00) Dublin, Edinburgh, Lisbon, London.
Where: Microsoft Teams Meeting

Hi all,

Trying again for the SPIG after the unfortunate cancellation of February's effort.

Microsoft Teams meeting

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Click here to join the meeting

Join with a video conferencing device

[redacted]

Video Conference ID: [redacted]

Alternate VTC instructions

Learn More | Meeting options

10.33 NERL invite to CAA to present Visualisation Simulations (14/03/2022)

-----Original Appointment-----
From: [redacted]
Sent: 23 February 2022 12:48
To: [redacted]
Cc: [redacted]
Subject: CAA - ScTMA PC Visualisation Simulations Placeholder
When: 14 March 2022 14:00-16:30 (UTC+00:00) Dublin, Edinburgh, Lisbon, London.
Where: Microsoft Teams Meeting

All

A placeholder until site access confirmed .

Thanks

[redacted]

Microsoft Teams meeting

Join on your computer or mobile app
Click here to join the meeting
Join with a video conferencing device
[redacted]
Video Conference ID: [redacted]
Alternate VTC instructions
Learn More | Meeting options

10.34 ACOG invite to NERL for ScTMA Deployment Coordination Meeting (15/03/2022)

Subject: ScTMA Programme Coordination Group
Location: Microsoft Teams Meeting

Start: Tue 15/03/2022 10:00
End: Tue 15/03/2022 11:30

Recurrence: (none)

Meeting Status: Accepted

Organizer: [redacted]

Categories: TMA Definition

Mimecast Attachment Protection has deemed this file to be safe, but always exercise caution when opening files.

Hi All,

Minutes from the earlier meeting to follow. The updated dependency tracker is attached.

Agenda for the next meeting:

1. Actions from previous meeting – Action Tracker - FASI-N ScTMA
2. Update from ACOG
3. Update from Sponsors – progress on stage 2 deliverables and dependencies
4. AOB

Kind regards

[redacted]

Microsoft Teams meeting

Join on your computer or mobile app
Click here to join the meeting

Learn More | Meeting options

10.35 NERL invite to Edinburgh and Glasgow Airports to Discuss Timebound SIDs (16/03/2022)

-----Original Appointment-----
From: [redacted]
Sent: 02 February 2022 12:12
To: [redacted]
Cc: [redacted]
Subject: Timebound SIDS discussion 2
When: 16 March 2022 14:00-15:00 (UTC+00:00) Dublin, Edinburgh, Lisbon, London.
Where: Microsoft Teams Meeting

Re the email thread over the past couple days gents – an hour slot to talk about time bound SIDS as requested. Alternative dates & times are a bit thin on the ground in the next couple of weeks but if its an absolute no can do for anyone please let me know, forward as appropriate as always.

Many thanks,

[redacted]

Microsoft Teams meeting

Join on your computer or mobile app

Click here to join the meeting

Join with a video conferencing device

[redacted]

Video Conference ID: [redacted]

Alternate VTC instructions

Learn More | Meeting options

10.36 Glasgow Airport invite to NERL to present ScTMA long list options to EGPF FLOPSC (16/03/2022)

Subject: Quarterly Flight Safety Meeting
Location: Microsoft Teams Meeting; #GLA Rm Sanderling (12)

Start: Wed 16/03/2022 10:00
End: Wed 16/03/2022 12:00
Show Time As: Tentative

Recurrence: (none)
Recurrence Pattern: Occurs every 3 months on the third Wednesday of the month from 10:00 to 12:00 effective 16/03/2022 until 21/12/2022. There are 4 more occurrences.

Meeting Status: Not yet responded

Organizer: [redacted]

[redacted]
NATS General Manager
[redacted] Airports
[redacted]

From: [redacted]
Sent: Thursday, December 23, 2021 2:19:51 PM
To: [redacted]

Subject: Quarterly Flight Safety Meeting
When: 16 March 2022 10:00-12:00.
Where: Microsoft Teams Meeting; #GLA Rm Sanderling (12)

Microsoft Teams meeting

Join on your computer or mobile app
Click here to join the meeting

Learn More | Meeting options

10.37 NERL invite to Edinburgh and Glasgow Airports to review Visualisations Simulations Phase 2 (18/03/2022)

This was an in-person meeting organised by telephone and therefore there is no invite evidence to submit. An attendance log has been provided to the CAA.

10.38 NERL invite to to MoD following Visualisation Simulations (25/03/2022)

-----Original Appointment-----
From: [redacted]
Sent: 18 January 2022 12:31
To: [redacted]
Cc: [redacted]
Subject: ScTMA -MIL Airspace Modernisation Engagement 3 - Feedback & vis sims update.
When: 25 March 2022 14:00-14:45 (UTC+00:00) Dublin, Edinburgh, Lisbon, London.
Where: Microsoft Teams Meeting

Availability clashes abound – an alternative that might suit us all better.

Cheers

[redacted]

Hi all – we'd like to move our catch up scheduled for tomorrow (17th Feb) out to this new date in march, by that point we will have refined feedback from both vis sim 1 and also vis sim 2 which is currently running until early march with hopefully attendance from Glasgow and Edinburgh in week beginning 14th March.

Many thanks,

[redacted]

____

Microsoft Teams meeting

Join on your computer or mobile app

Click here to join the meeting

Join with a video conferencing device

[redacted]

Video Conference ID: [redacted]

10.39 NERL invite to Cumbernauld Airport to discuss NERL long list of options (25/03/2022)

-----Original Appointment-----
From: [redacted]
Sent: 19 January 2022 14:57
To: [redacted]
Cc: [redacted]
Subject: NATS (NERL) ScTMA Airspace Modernisation Engagement Invitation
When: 25 March 2022 10:00-11:00 (UTC+00:00) Dublin, Edinburgh, Lisbon, London.
Where: Microsoft Teams Meeting

Dear Mr [redacted]

As you may know during the COVID pandemic NERL paused its ScTMA Airspace Modernisation ACP's as did most stakeholders in the FASI North and South Programs. I'm delighted to say that we have recently restarted this work and as our notified stakeholder representing Cumbernauld airport , we would like to invite you to an online Teams Stage 2 Engagement session on 25th March 1000-1100.

During the session we will introduce the NERL team, present where we are in the ACP process, provide an overview of conceptual design options being considered, take any questions you may have and of course also request your feedback.

Please feel free to forward this invite as appropriate within your organisation but in the meantime if you have any questions or seek an alternative date/time, please don't hesitate to contact me.

We look forward to seeing you.

Best regards,

[redacted]

NATS

10.40 NERL invite to Stakeholder airlines to discus NERL long list of options (30/03/2022)

-----Original Appointment-----
From: [redacted]
Sent: 03 March 2022 16:28
To: [redacted]
Cc: [redacted]
Subject: NATS engagement on airspace change proposals for ScTMA
When: 30 March 2022 15:00-16:00 (UTC+00:00) Dublin, Edinburgh, Lisbon, London.
Where: Microsoft Teams Meeting

Dear Customer

NATS engagement on airspace change proposals for ScTMA

NATS are progressing Airspace Change Proposals (ACPs) to make changes to the ATC route network for routes in and around the Scottish Terminal Manoeuvring Area (ScTMA), including routes to/from Glasgow and Edinburgh Airports. These ACPs are being progressed under the Future Airspace Strategy Implementation – North (FASI-N) programme.

As part of this process we are seeking feedback from stakeholders on a series of design options. This session will provide information on the design options being considered and seek customers input into these.

We would be very grateful for your response indicating whether you will be able to attend the session.

Regards,

[redacted]

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Microsoft Teams meeting

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Click here to join the meeting
Join with a video conferencing device
[redacted]
Video Conference ID: [redacted]
Alternate VTC instructions
Or call in (audio only)
[redacted] United Kingdom, London

10.41 NERL invite to Glasgow Airport to discuss visualisation simulations Phase 2 (06/04/2022)

-----Original Appointment-----
From: [redacted]
Sent: 28 March 2022 09:19
To: [redacted]
Cc: [redacted]
Subject: Vis Sim 2 Update
When: 06 April 2022 11:00-12:00 (UTC+00:00) Dublin, Edinburgh, Lisbon, London.
Where: Microsoft Teams Meeting

[redacted]

As discussed an opportunity to run through the output of the 2nd set of vis sims .

Regards

[redacted]

[redacted]

Airspace Implementation Manager
Prestwick Centre
D: [redacted]
M: [redacted]
E: [redacted]

4000 Parkway, Whiteley,
Fareham, Hants PO15 7FL
www.nats.co.uk

NATS PRIVATE

10.42 EGPH invite to NERL to attend ACP Design Worksop (06/04/2022)

-----Original Appointment-----
From: [redacted]
Sent: 30 March 2022 09:51
To: [redacted]
Cc: [redacted]
Subject: ACP design workshop
When: 06 April 2022 10:00-16:00 (UTC+00:00) Dublin, Edinburgh, Lisbon, London.
Where: Terminal - Typhoon (10)

CAUTION: This email originated from outside of the organisation. Do not click links or open attachments unless you recognise the sender and know the content is safe.

[redacted] to join from 1400 until 1600

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10.43 NERL invite to remaining stakeholders to discuss NERL long list of options (08/04/2022)

-----Original Appointment-----
From: [redacted]
Sent: 24 March 2022 10:37
To: [redacted]
Cc: [redacted]
Subject: Invitation to NATS NERL ScTMA Airspace Modernisation update.
When: 08 April 2022 10:00-11:00 (UTC+00:00) Dublin, Edinburgh, Lisbon, London.
Where: Microsoft Teams Meeting

Good morning everyone,

You may be aware that NATS (NERL) in common with several UK airports recently re started work on a number of Airspace Change Proposals (ACP's) following a pause in activities during 2020 and early 2021.

As a listed stakeholder at stage 1, I would like to invite you to an online Teams briefing session in which we will provide a progress update since restarting our ScTMA Airspace Modernisation ACP's , following the link below in this invitation will facilitate joining the Teams call.

Please note that NATS NERL ScTMA ACP's relate to airspace modernisation 7000ft and above.

We hope you can join us on 8th April, I look forward to seeing you.

Kind regards,

[redacted]

NATS
[redacted]
Airspace Engagement

E: [redacted]

Swanwick Centre
Sopwith Way
Swanwick
Hants
SO31 7AY

11. Annex D: Design Principle Evaluation

ANNEX D - ScTMA Options assessment matrix

DP	Priority	Quick Ref	Description	Suggested areas to consider (but not limited to)	Assessment means	Red	Amber	Green
1	High	Safety	Safety - The airspace will maintain or enhance current levels of safety		SME - subjective	Unlikely to pass a safety case	Issues identified that would require a robust safety case	no significant safety issues identified
2	High	Resilience	Operational - The proposed airspace will maintain or enhance operational resilience of the ATC network.	Arrivals - Delay Absorption	SME - Subjective	Decreased Delay absorption	No Change in delay absoption	Increased delay absorption
				Disruption Revery	SME - Subjective	Worse than current	No Change	Better than Current
3	High	Capacity	Operational - The proposed airspace design will yield the greatest capacity benefits from systemisation.	Airspace Capacity	SME - Subjective	Design option Unable to support the forecast traffic loading	Design option supports the forecast traffic loading but no capacity benefit	Design option supports the forecast traffic loading and increases capacity
				ATCO Workload	SME - Subjective	Design option increases ATCO workload	No change or minor increase to ATCO workload	Design option decreases ATCO workload
4	High	Interface	Technical - The ScTMA airspace design will provide a compatible and optimised interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network.	Free Route Airspace (FRA)	SME - Subjective	Option incompatible with FRA	Significant changes with FRA required for compatability	Minimal or no changes required for compatibility with FRA
				ATS Route Network	SME - Subjective	Option incompatible with ATS Route Network	Significant changes with ATS Route Network required for compatability	Minimal or no changes required for compatibility with ATS Route Network
				Lower level Airspace	SME - Subjective	Option incompatible with Lower level airspace	Significant changes with lower level airspace required for compatability	Minimal or no changes required for compatibility with lower level airspace
5	Medium	Economic	Economic - The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route. (Note: This includes track mileage / fuel burn / route charges)		SME - Subjective	Economic performance reduced	Economic performance as per today	Economic performance increased
6	Medium	Environmental	Environmental - The proposed ScTMA airspace will facilitate the reduction of CO_2 emissions along the entire route.		SME - Subjective	CO_2 emissions increased	CO_2 emissions as per today	CO_2 emissions reduced
7	Low	Environmental	Environmental - Minimise environmental impact to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsors ACP).		SME - Subjective	Increase in noise impacts below 7000ft	Change, but no net detrimental impacts on noise below 7000ft	No change in noise impacts below 7000ft
8	Medium	MoD	Operational - The ScTMA airspace should be compatible with the requirements of the MoD.		SME - Subjective	Major impact or safety critical impact	Minor impact and not safety critical	No impact or positive impact
9	Medium	GA	Operational - The impacts on GA and other civilian airspace users due to ScTMA should be minimised. (Note: This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures.)		SME - Subjective	Major impact or safety critical impact	Minor impact and not safety critical	No impact or positive impact
10	Medium	CAS	Technical -The classification and volume of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users. (Note: This may include releasing CAS as appropriate.)		SME - Subjective	Major increase in CAS volume required	Small increase in CAS volume required	No increase (or reduction in) CAS required
11	High	PBN	Technical - The route network linking airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. (Note: Where appropriate, the use of RNP should be considered if the fleet mix can support it.)		SME - Subjective	Significant extra airspace is required and/or significantly fewer overall routes can be accommodated due to lower RNAV standards	All routes are accommodated however an increase in airspace volume is required due to lower RNAV standards	All routes needed are accommodated or an appropriate RNAV standard used
12	High	AMS	Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. (Note: The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable - the need to maximise the utilisation of existing runway capacity)		SME - Subjective	Not aligned with the AMS	Partially aligned with the AMS	Aligned with the AMS
13	Medium	CCO/CCD	The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft.		SME - Subjective Airline Operator Feedback	Negative impact on CCO and CDO compared with today	CCO and CDO as per today	Positive impact on CCO and CDO

Eastern Element Conclusion and Shortlist

The design principle evaluation of each design option presented on the previous pages and are summarised in the table below.

Design / Option Name:		Option 0: Baseline (do nothing)	Option 1: East bound route only avoiding gliding area	Option 2: West bound route only avoiding gliding area	Option 3: Bidirectional Route avoiding Gliding Area	Option 4: Systemised Routes avoiding Gliding area	Option 5: East bound route only impacting gliding area	Option 6: West bound route only impacting gliding area	Option 7: Bidirectional route impacting gliding area	Option 8: Systemmised routes impacting gliding area
Accept / Reject		REJECT	REJECT	REJECT	REJECT	ACCEPT & PROGRESS	REJECT	REJECT	REJECT	ACCEPT & PROGRE
Design Principle 1: Safety Safety - The airspace will maintain or enhance current levels of safety	High	MET	MET	MET	MET	MET	MET	MET	MET	MET
Design Principle 2: Resilience Operational - The proposed airspace will maintain or enhance operational resilience of the ATC network.	High	PARTIAL	PARTIAL	PARTIAL	MET	MET	PARTIAL	PARTIAL	MET	MET
Design Principle 3: Capacity Operational - The proposed airspace design will yield the greatest capacity benefits from systemisation.	High	NOT	MET	MET	PARTIAL	MET	MET	MET	PARTIAL	MET
Design Principle 4: Interface Technical - The ScTMA airspace design will provide a compatible and optimised interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network.	High	NOT	NOT	NOT	MET	MET	NOT	NOT	MET	MET
Design Principle 5: Economic Economic - The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route. (Note: This includes track mileage / fuel burn / route charges)	Medium	PARTIAL	MET	MET	MET	MET	MET	MET	MET	MET
Design Principle 6: Environmental Environmental - The proposed ScTMA airspace will facilitate the reduction of CO2 emissions along the entire route.	Medium	PARTIAL	MET	MET	MET	MET	MET	MET	MET	MET
Design Principle 7: Environmental Environmental - Minimise environmental impact to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsors ACP).	Low	MET	MET	MET	MET	MET	MET	MET	MET	MET
Design Principle 8: MoD Operational - The ScTMA airspace should be compatible with the requirements of the MoD.	Medium	MET	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
Design Principle 9: GA Operational - The impacts on GA and other civilian airspace users due to ScTMA should be minimised. (Note: This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures.)	Medium	MET	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL	PARTIAL
Design Principle 10: CAS Technical -The classification and volume of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users. (Note: This may include releasing CAS as appropriate.)	Medium	MET	NOT	NOT	NOT	NOT	NOT	NOT	NOT	NOT
Design Principle 11: PBN Technical - The route network linking airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. (Note: Where appropriate, the use of RNP should be considered if the fleet mix can support it.)	High	NOT	MET	MET	MET	MET	MET	MET	MET	MET
Design Principle 12: AMS Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. (Note: The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable - the need to maximise the utilisation of existing runway capacity)	High	NOT	PARTIAL	PARTIAL	MET	MET	PARTIAL	PARTIAL	MET	MET
Design Principle 13: CCO/CCD The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft.	Medium	PARTIAL	PARTIAL	PARTIAL	MET	MET	PARTIAL	PARTIAL	MET	MET

Progression criteria: Options having any High Design Principle which are Not Met (red) or 2 or more Med Design Principle Not Met or greater than 5 Design Principles partially met have been rejected.

Next Steps

Options 4 & 8 will be formally appraised under the Stage 2, Step 2B Options Appraisal (Phase 1 Initial), including Safety Assessment.

Option 0: Baseline (do nothing)	REJECT	Assessmt matrix ref
This option represents the existing airspace design, i.e. the "do nothing" option.		
Design Principle 1: Safety — High Safety - The airspace will maintain or enhance current levels of safety The exsiting airspace is demonstrably safe. This option represents the baseline for safety against which other options will be assessed.	MET	no significant safety issues identified
Design Principle 2: Resilience — High Operational - The proposed airspace will maintain or enhance operational resilience of the ATC network. Resilience maintained but not enhanced. No improvement from today's operation.	PARTIAL	No change
Design principle 3: Capacity — High Operational - The proposed airspace design will yield the greatest capacity benefits from systemisation. Network routings do not exist and airspace is not currently used by ScTMA aircraft. Aircraft can elect to route outside of CAS on a UKFIS.	NOT	Design option Unable to support the forecast traffic loading
Design principle 4: Interface — High Technical - The ScTMA airspace design will provide a compatible and optimised interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network. No current connectivity. Aircraft can request UKFIS but wold increase controller workload through additional coordination requests.	NOT	Significant changes with lower level airspace required for compatability
Design principle 5: Economic — Medium Economic - The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route. (Note: This includes track mileage / fuel burn / route charges) No Change - no impact.	PARTIAL	Economic performance as per today
Design principle 6: Environmental — Medium Environmental - The proposed ScTMA airspace will facilitate the reduction of CO2 emissions along the entire route. No Change - no impact.	PARTIAL	CO2 emissions as per today
Design principle 7: Environmental — Low Environmental - Minimise environmental impact to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsors ACP). No change - no impact.	MET	No change in noise impacts below 7000ft
Design principle 8: MoD — Medium Operational - The ScTMA airspace should be compatible with the requirements of the MoD. No change - no impact.	MET	No impact or positive impact
Design principle 9: GA — Medium Operational - The impacts on GA and other civilian airspace users due to ScTMA should be minimised. (Note: This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures.) No change - no impact.	MET	No impact or positive impact
Design principle 10: CAS — Medium Technical -The classification and volume of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users. (Note: This may include releasing CAS as appropriate.) No additional CAS reqired	MET	No increase (or reduction in) CAS required
Design principle 11: PBN — High Technical - The route network linking airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. (Note: Where appropriate, the use of RNP should be considered if the fleet mix can support it.) No existing routes so no PBN utilisation.	NOT	Significant extra airspace is required and/or significantly fewer overall routes can be accommodated
Design principle 12: AMS — High Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. (Note: The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable - the need to maximise the utilisation of existing runway capacity) No existing PBN routes and no capacity benefits	NOT	Not aligned with the AMS
Design principle 13: CCO/CCD — Medium The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft. Aircraft could elect to route outside of CAS with a UKFIS provision. CCO and CCD for these aircraft will be unchanged.	PARTIAL	CCO and CDO as per today

Conclusion:
The Do nothing Option represents no change, and will not be progressed.

Option 1: East bound route only avoiding gliding area		REJECT	Assessmt matrix ref
Introduction of an East bound unidirectional ATS route connecting FRA to the ScTMA. This option will remain clear of the Northumbria gliding area.			
Design Principle 1: Safety Safety - The airspace will maintain or enhance current levels of safety No safety issues have been identified with this option.	High	MET	no significant safety issues identified
Design Principle 2: Resilience Operational - The proposed airspace will maintain or enhance operational resilience of the ATC network. Option 1 improves disruption recovery by providing an additional departure route, however this option offers no benefit to arrivals.	High	PARTIAL	No Change in delay absoption
Design principle 3: Capacity Operational - The proposed airspace design will yield the greatest capacity benefits from systemisation. Capacity is improved by redistributing departures from within the TMA to the Eastern element. This inturn will decrease controller workload which will increase capacity.	High	MET	Design option supports the forecast traffic loading and increases capacity
Design principle 4: Interface Technical - The ScTMA airspace design will provide a compatible and optimised interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network. Option 1 does not offer any options for arrivals so remains incompatable for aircraft arriving into the TMA.	High	NOT	Option incompatible with Lower level airspace
Design principle 5: Economic Economic - The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route. (Note: This includes track mileage / fuel burn / route charges) Option 1 offers a substantial reduction in track mlage and associated fuel bnefit for aircraft exiting the ScTMA to the East.	Medium	MET	Economic performance increased
Design principle 6: Environmental Environmental - The proposed ScTMA airspace will facilitate the reduction of CO2 emissions along the entire route. Option 1 offers a substantial reduction in track mileage and associated CO_2 bnefit for aircraft exiting the ScTMA to the East.	Medium	MET	CO2 emissions reduced
Design principle 7: Environmental Environmental - Minimise environmental impact to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsors ACP). No change - no impact.	Low	MET	No change in noise impacts below 7000ft
Design principle 8: MoD Operational - The ScTMA airspace should be compatible with the requirements of the MoD. Option 1 requires additional CAS which may encroach on airspace used by the MoD. MoD access will be maintained as required.	Medium	PARTIAL	Minor impact and not safety critical
Design principle 9: GA Operational - The impacts on GA and other civilian airspace users due to ScTMA should be minimised. (Note: This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures.) Option 1 does require additional CAS however, this airspace is rarely used by the GA community.	Medium	PARTIAL	Minor impact and not safety critical
Design principle 10: CAS Technical -The classification and volume of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users. (Note: This may include releasing CAS as appropriate.) Option 1 will require a large area of additional CAS however, this will be kept to the minimum required to contain a single ATS route.	Medium	NOT	Major increase in CAS volume required
Design principle 11: PBN Technical - The route network linking airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. (Note: Where appropriate, the use of RNP should be considered if the fleet mix can support it.) Any additional routes will be designed to the highest suitable RNAV standard.	High	MET	All routes are accommodated however an increase in airspace volume is required due to lower
Design principle 12: AMS Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. (Note: The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable - the need to maximise the utilisation of existing runway capacity) This option does not accommodate arrivals and therefore does not take maximum advantage of the airspace	High	PARTIAL	Partially aligned with the AMS
Design principle 13: CCO/CCD The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft. This option will offer a positive improvement to CCO but not CDO.	Medium	PARTIAL	CCO and CDO as per today

Conclusion:
This option had promising aspects, however it will require a large area of additional CAS. This option does not offer an arrival option nor does the concept allow for the most direct routes as the
gliding area has to be avoided. These two factors limits the available benefit which would be used to offset the additional CAS required. As such this option is not as good as an option that offers
both arrival and departure options and impacts the gliding area.
2 DP's (1 high) were not met and hence is option is Rejected.

Option 2: West bound route only avoiding gliding area	REJECT	Assessmt matrix ref
Introduction of a West bound unidirectional ATS route connecting the ScTMA to FRA. This option will remain clear of the Northumbria gliding area.		
Design Principle 1: Safety — High Safety - The airspace will maintain or enhance current levels of safety No safety issues have been identified with this option.	MET	no significant safety issues identified
Design Principle 2: Resilience — High Operational - The proposed airspace will maintain or enhance operational resilience of the ATC network. Option 2 offers improved delay absortption as the additional CAS increases options to absorb any delay. However, this option offers no benefit to departures	PARTIAL	No Change
Design principle 3: Capacity — High Operational - The proposed airspace design will yield the greatest capacity benefits from systemisation. Capacity is improved by redistributing departures from within the TMA to the Eastern element. This inturn will decrease controller workload which will increase capacity.	MET	Design option decreases ATCO workload
Design principle 4: Interface — High Technical - The ScTMA airspace design will provide a compatible and optimised interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network. Option 2 does not offer any options for departures so remains incompatable for aircraft exiting the TMA.	NOT	Significant changes with lower level airspace required for compatability
Design principle 5: Economic — Medium Economic - The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route. (Note: This includes track mileage / fuel burn / route charges) Option 2 offers a substantial reduction in track mlage and associated fuel bnefit for aircraft arriving at the ScTMA from the East..	MET	Economic performance increased
Design principle 6: Environmental — Medium Environmental - The proposed ScTMA airspace will facilitate the reduction of CO2 emissions along the entire route. Option 2 offers a substantial reduction in track mileage and associated CO_2 bnefit for aircraft entering the ScTMA from the East.	MET	CO2 emissions reduced
Design principle 7: Environmental — Low Environmental - Minimise environmental impact to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsors ACP). No change - no impact.	MET	No change in noise impacts below 7000ft
Design principle 8: MoD — Medium Operational - The ScTMA airspace should be compatible with the requirements of the MoD. Option 2 requires additional CAS which may encroach on airspace used by the MoD. MoD access will be maintained as required.	PARTIAL	Minor impact and not safety critical
Design principle 9: GA — Medium Operational - The impacts on GA and other civilian airspace users due to ScTMA should be minimised. (Note: This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures.) Option 2 does require additional CAS however, this airspace is rarely used by the GA community.	PARTIAL	Minor impact and not safety critical
Design principle 10: CAS — Medium Technical -The classification and volume of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users. (Note: This may include releasing CAS as appropriate.) Option 2 will require a large area of additional CAS however, this will be kept to the minimum required to contain a single ATS route.	NOT	Major increase in CAS volume required
Design principle 11: PBN — High Technical - The route network linking airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. (Note: Where appropriate, the use of RNP should be considered if the fleet mix can support it.) Any additional routes will be designed to the highest suitable RNAV standard.	MET	All routes are accommodated however an increase in airspace volume is required due to lower
Design principle 12: AMS — High Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. (Note: The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable - the need to maximise the utilisation of existing runway capacity) This option does not accommodate departures and therefore does not take maximum advantage of the airspace	PARTIAL	Partially aligned with the AMS
Design principle 13: CCO/CCD — Medium The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft. This option will offer a positive improvement to CDO but not CCO	PARTIAL	CCO and CDO as per today

Conclusion:
This option had promising aspects, however it will require a large area of additional CAS. This option does not offer an departure option nor does the concept allow for the most direct routes as the
gliding area has to be avoided. These two factors limits the available benefit which would be used to offset the additional CAS required. As such this option is not as good as an option that offers
both arrival and departure options and impacts the gliding area.
2DP's (1 high) were not met and hence this option is Rejected.

Option 3: Bidirectional Route avoiding Gliding Area	REJECT	Assessmt matrix ref
Introduction of a bidirectional ATS route providing connectivity between FRA and the ScTMA. This option will remain clear of the Northumbria gliding area.		
Design Principle 1: Safety — High Safety - The airspace will maintain or enhance current levels of safety No safety issues have been identified with this option.	MET	no significant safety issues identified
Design Principle 2: Resilience — High Operational - The proposed airspace will maintain or enhance operational resilience of the ATC network. Option 3 offers improved delay absortption and disruption recovery as both arrivals and departures are accomodated. The additional CAS increases options to absorb any delay.	MET	Increased delay absorption
Design principle 3: Capacity — High Operational - The proposed airspace design will yield the greatest capacity benefits from systemisation. Capacity is improved by redistributing arrivals and departures from within the TMA to the Eastern element reducing controller workload in one area. However, controller workload is increased in the region of the change as arrivals and departures will not be deconflicted therefore no net change in controller workload is expected.	PARTIAL	No change to ATCO workload
Design principle 4: Interface — High Technical - The ScTMA airspace design will provide a compatible and optimised interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network. Option 3 provides connectivity compatable with the surrounding airspace.	MET	Minimal or no changes required for compatibility with lower level airspace
Design principle 5: Economic — Medium Economic - The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route. (Note: This includes track mileage / fuel burn / route charges) Option 3 offers a substantial reduction in track mlage and associated fuel bnefit for aircraft arriving and departing the ScTMA from the East.	MET	Economic performance increased
Design principle 6: Environmental — Medium Environmental - The proposed ScTMA airspace will facilitate the reduction of CO2 emissions along the entire route. Option 3 offers a substantial reduction in track mileage and associated CO_2 bnefit for aircraft arriving and departing the ScTMA from the East.	MET	CO2 emissions as per today
Design principle 7: Environmental — Low Environmental - Minimise environmental impact to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsors ACP). No change - no impact.	MET	No change in noise impacts below 7000ft
Design principle 8: MoD — Medium Operational - The ScTMA airspace should be compatible with the requirements of the MoD. Option 3 requires additional CAS which may encroach on airspace used by the MoD. MoD access will be maintained as required.	PARTIAL	Minor impact and not safety critical
Design principle 9: GA — Medium Operational - The impacts on GA and other civilian airspace users due to ScTMA should be minimised. (Note: This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures.) Option 3 does require additional CAS however, this airspace is rarely used by the GA community.	PARTIAL	Minor impact and not safety critical
Design principle 10: CAS — Medium Technical -The classification and volume of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users. (Note: This may include releasing CAS as appropriate.) Option 3 will require a large area of additional CAS however, this will be kept to the minimum required to contain a single bidirectional ATS route.	NOT	Major increase in CAS volume required
Design principle 11: PBN — High Technical - The route network linking airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. (Note: Where appropriate, the use of RNP should be considered if the fleet mix can support it.) Any additional routes will be designed to an appropriate RNAV standard.	MET	All routes are accommodated however an increase in airspace volume is required due to lower
Design principle 12: AMS — High Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. (Note: The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable - the need to maximise the utilisation of existing runway capacity) This option does align with the AMS	MET	Aligned with the AMS
Design principle 13: CCO/CCD — Medium The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft. This option will offer positive improvement to CDO and CCO	MET	Positive impact on CCO and CDO

Conclusion:
This option had promising aspects, however it will require a large area of additional CAS. This option offers departure and arrival options, but these routes are not deconflicted and could require
ATCO intervention to resolve conflictions. This concept does not allow for the most direct routes as the gliding area has to be avoided. Although substantial benefit is still expected, this is limited by
not impacting the gliding area. As such this option is not as good as an option that impacts the gliding area and makes use of systemisation.
1 DP was not met (1 med) 2 DPs were partially met (1 high) and hence this option is Rejected.

Option 4: Systemised Routes avoiding Gliding area	ACCEPT & PROGRESS	Assessmt matrix ref
Introduction of a systemised ATS route structure providing connectivity between FRA and the ScTMA. This option will remain clear of the Northumbria gliding area.		
Design Principle 1: Safety — High Safety - The airspace will maintain or enhance current levels of safety No safety issues have been identified with this option.	MET	no significant safety issues identified
Design Principle 2: Resilience — High Operational - The proposed airspace will maintain or enhance operational resilience of the ATC network. Option 4 offers improved delay absortption and disruption recovery as both arrivals and departures are accomodated and separated through systemisation. The additional CAS increases options to absorb any delay.	MET	Better than Current
Design principle 3: Capacity — High Operational - The proposed airspace design will yield the greatest capacity benefits from systemisation. Capacity is improved by redistributing arrivals and departures from within the TMA to the Eastern element. Controller workload is dcreased as a result of systemisation.	MET	Design option decreases ATCO workload
Design principle 4: Interface — High Technical - The ScTMA airspace design will provide a compatible and optimised interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network. Option 4 provides connectivity compatable with the surrounding airspace.	MET	Minimal or no changes required for compatibility with FRA
Design principle 5: Economic — Medium Economic - The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route. (Note: This includes track mileage / fuel burn / route charges) Option 4 offers a substantial reduction in track mlage and associated fuel benefit for aircraft arriving and departing the ScTMA from the East.	MET	Economic performance increased
Design principle 6: Environmental — Medium Environmental - The proposed ScTMA airspace will facilitate the reduction of CO2 emissions along the entire route. Option 4 offers a substantial reduction in track mileage and associated CO_2 benefit for aircraft arriving and departing the ScTMA from the East.	MET	CO2 emissions reduced
Design principle 7: Environmental — Low Environmental - Minimise environmental impact to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsors ACP). No change - no impact.	MET	No change in noise impacts below 7000ft
Design principle 8: MoD — Medium Operational - The ScTMA airspace should be compatible with the requirements of the MoD. Option 4 requires additional CAS which may encroach on airspace used by the MoD. MoD access will be maintained as required.	PARTIAL	Minor impact and not safety critical
Design principle 9: GA — Medium Operational - The impacts on GA and other civilian airspace users due to ScTMA should be minimised. (Note: This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures.) Option 4 does require additional CAS however, this airspace is rarely used by the GA community.	PARTIAL	Minor impact and not safety critical
Design principle 10: CAS — Medium Technical -The classification and volume of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users. (Note: This may include releasing CAS as appropriate.) Option 4 will require a large area of additional CAS however, this will be kept to the minimum required to contain a systemised airsace.	NOT	Major increase in CAS volume required
Design principle 11: PBN — High Technical - The route network linking airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. (Note: Where appropriate, the use of RNP should be considered if the fleet mix can support it.) Any additional routes will be designed to the highest suitable RNAV standard.	MET	All routes are accommodated however an increase in airspace volume is required due to lower
Design principle 12: AMS — High Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. (Note: The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable - the need to maximise the utilisation of existing runway capacity) This option does align with the AMS	MET	Aligned with the AMS
Design principle 13: CCO/CCD — Medium The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft. This option will offer a positive improvement to CCO and CDO	MET	Positive impact on CCO and CDO

Conclusion:
The systemised PBN routes offers deconflicted departure and arrival options requiring minimal controller tactical intervention. This concept does not allow for the most direct routes as the gliding area
has to be avoided. Although substantial benefit is still expected, this is limited by not impacting the gliding area. As such this option could be improved by impacting the gliding area, Option 9.
This option is considered a promising candidate and has been **Progressed** to the next Stage.

Option 5: East bound route only impacting gliding area	REJECT	Assessmt matrix ref
Introduction of an East bound unidirectional ATS route connecting FRA to the ScTMA. This option will provide optimum flight profiles by impacting the Northumbria gliding area.		
Design Principle 1: Safety — High Safety - The airspace will maintain or enhance current levels of safety No safety issues have been identified with this option.	MET	no significant safety issues identified
Design Principle 2: Resilience — High Operational - The proposed airspace will maintain or enhance operational resilience of the ATC network. Option 5 improves disruption recovery by providing an additional departure route, however this option offers no benefit to arrivals.	PARTIAL	No Change in delay absoption
Design principle 3: Capacity — High Operational - The proposed airspace design will yield the greatest capacity benefits from systemisation. Capacity is improved by redistributing departures from within the TMA to the Eastern element. This inturn will decrease controller workload which will increase capacity.	MET	Design option supports the forecast traffic loading and increases capacity
Design principle 4: Interface — High Technical - The ScTMA airspace design will provide a compatible and optimised interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network. Option 5 does not offer any options for arrivals so remains incompatable for aircraft arriving into the TMA.	NOT	Option incompatible with Lower level airspace
Design principle 5: Economic — Medium Economic - The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route. (Note: This includes track mileage / fuel burn / route charges) Option 5 offers a substantial reduction in track mlage and associated fuel bnefit for aircraft exiting the ScTMA to the East.	MET	Economic performance increased
Design principle 6: Environmental — Medium Environmental - The proposed ScTMA airspace will facilitate the reduction of CO2 emissions along the entire route. Option 5 offers a substantial reduction in track mileage and associated CO_2 bnefit for aircraft exiting the ScTMA to the East.	MET	CO2 emissions reduced
Design principle 7: Environmental — Low Environmental - Minimise environmental impact to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsors ACP). No change - no impact.	MET	No change in noise impacts below 7000ft
Design principle 8: MoD — Medium Operational - The ScTMA airspace should be compatible with the requirements of the MoD. Option 5 requires additional CAS which may encroach on airspace used by the MoD. MoD access will be maintained as required.	PARTIAL	Minor impact and not safety critical
Design principle 9: GA — Medium Operational - The impacts on GA and other civilian airspace users due to ScTMA should be minimised. (Note: This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures.) Option 5 does require additional CAS however, this airspace is rarely used by the GA community. The additional portion of the gliding area can be offset by improving access to the remaining area	PARTIAL	Minor impact and not safety critical
Design principle 10: CAS — Medium Technical -The classification and volume of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users. (Note: This may include releasing CAS as appropriate.) Option 5 will require a large area of additional CAS however, this will be kept to the minimum required to contain a single ATS route.	NOT	Major increase in CAS volume required
Design principle 11: PBN — High Technical - The route network linking airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. (Note: Where appropriate, the use of RNP should be considered if the fleet mix can support it.) Any additional routes will be designed to the highest suitable RNAV standard.	MET	All routes are accommodated howev er an increase in airspace volume is required due to lower
Design principle 12: AMS — High Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. (Note: The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable - the need to maximise the utilisation of existing runway capacity) This option does not accommodate arrivals and therefore does not take maximum advantage of the airspace	PARTIAL	Partially aligned with the AMS
Design principle 13: CCO/CCD — Medium The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft. This option will offer a positive improvement to CCO but not CDO	PARTIAL	CCO and CDO as per today

Conclusion:
This option improves Option 1 by allowing routes to impact the gliding area. However, it will still require a large area of additional CAS. By not providing an arrival option, the available benefit which
could be used to offset the additional CAS required is limited. As such this option is not as good as an option that offers both arrival and departure options.
2 DP's (1 high) were not met and hence is option is Rejected.

ANNEX D

Option 6: West bound route only impacting gliding area		REJECT	Assessmt matrix ref
Introduction of a West bound unidirectional ATS route connecting the ScTMA to FRA. This option will provide optimum flight profiles by impacting the Northumbria gliding area.			
Design Principle 1: Safety Safety - The airspace will maintain or enhance current levels of safety No safety issues have been identified with this option.	High	MET	no significant safety issues identified
Design Principle 2: Resilience Operational - The proposed airspace will maintain or enhance operational resilience of the ATC network. Option 6 offers improved delay absortption as the additional CAS increases options to absorb any delay. However, this option offers no benefit to departures	High	PARTIAL	No change
Design principle 3: Capacity Operational - The proposed airspace design will yield the greatest capacity benefits from systemisation. Capacity is improved by redistributing departures from within the TMA to the Eastern element. This inturn will decrease controller workload which will increase capacity.	High	MET	Design option increases ATCO workload
Design principle 4: Interface Technical - The ScTMA airspace design will provide a compatible and optimised interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network. Option 6 does not offer any options for departures so remains incompatable for aircraft exiting the TMA.	High	NOT	Significant changes with lower level airspace required for compatability
Design principle 5: Economic Economic - The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route. (Note: This includes track mileage / fuel burn / route charges) Option 6 offers a substantial reduction in track mlage and associated fuel bnefit for aircraft arriving at the ScTMA from the East..	Medium	MET	Economic performance as per today
Design principle 6: Environmental Environmental - The proposed ScTMA airspace will facilitate the reduction of CO2 emissions along the entire route. Option 6 offers a substantial reduction in track mileage and associated CO_2 bnefit for aircraft entering the ScTMA from the East.	Medium	MET	CO2 emissions as per today
Design principle 7: Environmental Environmental - Minimise environmental impact to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsors ACP). No change - no impact.	Low	MET	Increase in noise impacts below 7000ft
Design principle 8: MoD Operational - The ScTMA airspace should be compatible with the requirements of the MoD. Option 6 requires additional CAS which may encroach on airspace used by the MoD. MoD access will be maintained as required.	Medium	PARTIAL	Minor impact and not safety critical
Design principle 9: GA Operational - The impacts on GA and other civilian airspace users due to ScTMA should be minimised. (Note: This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures.) Option 6 does require additional CAS however, this airspace is rarely used by the GA community. The additional portion of the gliding area can be offset by improving access to the remaining area	Medium	PARTIAL	Minor impact and not safety critical
Design principle 10: CAS Technical -The classification and volume of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users. (Note: This may include releasing CAS as appropriate.) Option 6 will require a large area of additional CAS however, this will be kept to the minimum required to contain a single ATS route.	Medium	NOT	Major increase in CAS volume required
Design principle 11: PBN Technical - The route network linking airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. (Note: Where appropriate, the use of RNP should be considered if the fleet mix can support it.) Any additional routes will be designed to the highest suitable RNAV standard.	High	MET	All routes are accommodated howev er an increase in airspace volume is required due to lower
Design principle 12: AMS Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. (Note: The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable - the need to maximise the utilisation of existing runway capacity) This option does not accommodate departures and therefore does not take maximum advantage of the airspace	High	PARTIAL	Partially aligned with the AMS
Design principle 13: CCO/CCD The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft. This option will offer a positive improvement to CDO but not CCO	Medium	PARTIAL	Positive impact on CCO and CDO

Conclusion:
This option improves Option 2 by allowing routes to impact the gliding area. However it will still require a large area of additional CAS. By not providing an departure option, the available benefit
which could be used to offset the additional CAS required is limited. As such this option is not as good as an option that offers both arrival and departure options.
2DP's (1 high) were not met and hence this option is Rejected.

Option 7: Bidirectional route impacting gliding area	REJECT	Assessmt matrix ref
Introduction of a bidirectional ATS route providing connectivity between FRA and the ScTMA. This option will provide optimum flight profiles by impacting the Northumbria gliding area.		
Design Principle 1: Safety — High Safety - The airspace will maintain or enhance current levels of safety No safety issues have been identified with this option.	MET	no significant safety issues identified
Design Principle 2: Resilience — High Operational - The proposed airspace will maintain or enhance operational resilience of the ATC network. Option 7 offers improved delay absortption and disruption recovery as both arrivals and departures are accomodated. The additional CAS increases options to absorb any delay.	MET	Increased delay absorption
Design principle 3: Capacity — High Operational - The proposed airspace design will yield the greatest capacity benefits from systemisation. Capacity is improved by redistributing arrivals and departures from within the TMA to the Eastern element. However, controller workload is increased in the region of the change as arrivals and departures will not be deconflicted therefore no net change in controller workload is expected.	PARTIAL	No change to ATCO workload
Design principle 4: Interface — High Technical - The ScTMA airspace design will provide a compatible and optimised interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network. Option 7 provides connectivity compatable with the surrounding airspace.	MET	Minimal or no changes required for compatibility with FRA
Design principle 5: Economic — Medium Economic - The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route. (Note: This includes track mileage / fuel burn / route charges) Option 7 offers a substantial reduction in track mlage and associated fuel bnefit for aircraft arriving and departing the ScTMA from the East.	MET	Economic performance increased
Design principle 6: Environmental — Medium Environmental - The proposed ScTMA airspace will facilitate the reduction of CO2 emissions along the entire route. Option 7 offers a substantial reduction in track mileage and associated CO_2 bnefit for aircraft arriving and departing the ScTMA from the East.	MET	CO2 emissions reduced
Design principle 7: Environmental — Low Environmental - Minimise environmental impact to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsors ACP). No change - no impact.	MET	No change in noise impacts below 7000ft
Design principle 8: MoD — Medium Operational - The ScTMA airspace should be compatible with the requirements of the MoD. Option 7 requires additional CAS which may encroach on airspace used by the MoD. MoD access will be maintained as required.	PARTIAL	Minor impact and not safety critical
Design principle 9: GA — Medium Operational - The impacts on GA and other civilian airspace users due to ScTMA should be minimised. (Note: This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures.) Option 7 does require additional CAS however, this airspace is rarely used by the GA community. he additional portion of the gliding area can be offset by improving access to the remaining area	PARTIAL	Minor impact and not safety critical
Design principle 10: CAS — Medium Technical -The classification and volume of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users. (Note: This may include releasing CAS as appropriate.) Option 7 will require a large area of additional CAS however, this will be kept to the minimum required to contain a single bidirectional ATS route.	NOT	Major increase in CAS volume required
Design principle 11: PBN — High Technical - The route network linking airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. (Note: Where appropriate, the use of RNP should be considered if the fleet mix can support it.) Any additional routes will be designed to the highest suitable RNAV standard.	MET	All routes are accommodated howev er an increase in airspace volume is required due to lower
Design principle 12: AMS — High Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. (Note: The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable - the need to maximise the utilisation of existing runway capacity) This option does align with the AMS	MET	Aligned with the AMS
Design principle 13: CCO/CCD — Medium The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft. This option will offer positive improvement to CDO and CCO	MET	Positive impact on CCO and CDO

Conclusion:
This option improves Option 3 by allowing routes to impact the gliding area. However it will require a large area of additional CAS. This option offers departure and arrival options, but these routes
are not deconflicted and could require ATCO intervention to resolve conflictions. As such this option is not as good as an option that makes use of systemisation.
1DP (1 Med) were not met and 2DP's were partially met (1 high) hence this option is Rejected.

Option 8: Systemmised routes impacting gliding area		ACCEPT & PROGRESS	Assessmt matrix ref
Introduction of a systemised ATS route structure providing connectivity between FRA and the ScTMA. This option will provide optimum flight profiles by impacting the Northumbria gliding			
Design Principle 1: Safety Safety - The airspace will maintain or enhance current levels of safety No safety issues have been identified with this option.	High	MET	no significant safety issues identified
Design Principle 2: Resilience Operational - The proposed airspace will maintain or enhance operational resilience of the ATC network. Option 9 offers improved delay absortption and disruption recovery as both arrivals and departures are accomodated and separated through systemisation. The additional CAS increases options to absorb any delay.	High	MET	Better than Current
Design principle 3: Capacity Operational - The proposed airspace design will yield the greatest capacity benefits from systemisation. Capacity is improved by redistributing arrivals and departures from within the TMA to the Eastern element. Controller workload is dcreased as a result of systemisation.	High	MET	Design option decreases ATCO workload
Design principle 4: Interface Technical - The ScTMA airspace design will provide a compatible and optimised interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network. Option 9 provides connectivity compatable with the surrounding airspace.	High	MET	Minimal or no changes required for compatibility with FRA
Design principle 5: Economic Economic - The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route. (Note: This includes track mileage / fuel burn / route charges) Option 9 offers a substantial reduction in track mlage and associated fuel benefit for aircraft arriving and departing the ScTMA from the East.	Medium	MET	Economic performance increased
Design principle 6: Environmental Environmental - The proposed ScTMA airspace will facilitate the reduction of CO2 emissions along the entire route. Option 9 offers a substantial reduction in track mileage and associated CO_2 benefit for aircraft arriving and departing the ScTMA from the East.	Medium	MET	CO2 emissions reduced
Design principle 7: Environmental Environmental - Minimise environmental impact to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsors ACP). No change - no impact.	Low	MET	No change in noise impacts below 7000ft
Design principle 8: MoD Operational - The ScTMA airspace should be compatible with the requirements of the MoD. Option 9 requires additional CAS which may encroach on airspace used by the MoD. MoD access will be maintained as required.	Medium	PARTIAL	Minor impact and not safety critical
Design principle 9: GA Operational - The impacts on GA and other civilian airspace users due to ScTMA should be minimised. (Note: This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures.) Option 9 does require additional CAS however, this airspace is rarely used by the GA community. The additional portion of the gliding area can be offset by improving access to the remaining area	Medium	PARTIAL	Minor impact and not safety critical
Design principle 10: CAS Technical -The classification and volume of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users. (Note: This may include releasing CAS as appropriate.) Option 9 will require a large area of additional CAS however, this will be kept to the minimum required to contain a systemised airsace.	Medium	NOT	Major increase in CAS volume required
Design principle 11: PBN Technical - The route network linking airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. (Note: Where appropriate, the use of RNP should be considered if the fleet mix can support it.) Any additional routes will be designed to the highest suitable RNAV standard.	High	MET	All routes are accommodated however an increase in airspace volume is required due to lower
Design principle 12: AMS Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. (Note: The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable - the need to maximise the utilisation of existing runway capacity) This option does align with the AMS	High	MET	Aligned with the AMS
Design principle 13: CCO/CCD The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft. This option will offer a positive improvement to CCO and CDO	Medium	MET	Positive impact on CCO and CDO

Conclusion:
Systemised PBN routes offers deconflicted departure and arrival options requiring minimal controller tactical intervention. This concept allows for the most direct routes available as the gliding area can
be transited delivering substantial benefit.
This option is considered a promising candidate and has been **Progressed** to the next Stage.

South Eastern Element Conclusion and Shortlist

The design principle evaluation of each design option presented on the previous pages and are summarised in the table below.

Design / Option Name:		Option 0: Baseline (do nothing)	Option 1: Bidirectional route with lowered bases	Option 2: Systemised routes	Option 3: Systemised routes with lowered bases
Accept / Reject		REJECT	REJECT	REJECT	ACCEPT & PROGRE
Design Principle 1: Safety Safety - The airspace will maintain or enhance current levels of safety	High	MET	MET	MET	MET
Design Principle 2: Resilience Operational - The proposed airspace will maintain or enhance operational resilience of the ATC network.	High	PARTIAL	MET	MET	MET
Design Principle 3: Capacity Operational - The proposed airspace design will yield the greatest capacity benefits from systemisation.	High	NOT	PARTIAL	MET	MET
Design Principle 4: Interface Technical - The ScTMA airspace design will provide a compatible and optimised interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network.	High	MET	MET	MET	MET
Design Principle 5: Economic Economic - The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route. (Note: This includes track mileage / fuel burn / route charges)	Medium	PARTIAL	MET	PARTIAL	MET
Design Principle 6: Environmental Environmental - The proposed ScTMA airspace will facilitate the reduction of CO2 emissions along the entire route.	Medium	PARTIAL	MET	PARTIAL	MET
Design Principle 7: Environmental Environmental - Minimise environmental impact to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsors ACP).	Low	MET	MET	MET	MET
Design Principle 8: MoD Operational - The ScTMA airspace should be compatible with the requirements of the MoD.	Medium	MET	PARTIAL	PARTIAL	PARTIAL
Design Principle 9: GA Operational - The impacts on GA and other civilian airspace users due to ScTMA should be minimised. (Note: This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures.)	Medium	MET	PARTIAL	PARTIAL	PARTIAL
Design Principle 10: CAS Technical -The classification and volume of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users. (Note: This may include releasing CAS as appropriate.)	Medium	MET	PARTIAL	PARTIAL	PARTIAL
Design Principle 11: PBN Technical - The route network linking airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. (Note: Where appropriate, the use of RNP should be considered if the fleet mix can support it.)	High	MET	MET	MET	MET
Design Principle 12: AMS Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. (Note: The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable - the need to maximise the utilisation of existing runway capacity)	High	PARTIAL	MET	MET	MET
Design Principle 13: CCO/CCD The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft.	Medium	PARTIAL	PARTIAL	PARTIAL	MET

Progression criteria: Options having any High Design Principle which are Not Met (red) or 2 or more Med Design Principle Not Met or greater than 5 Design Principles partially met have been rejected.

Next Steps

Options 3 will be formally appraised under the Stage 2, Step 2B Options Appraisal (Phase 1 Initial), including Safety Assessment.

Option 0: Baseline (do nothing)	REJECT	Assessmt matrix ref
This option represents the existing airspace design, i.e. the "do nothing" option.		
Design Principle 1: Safety — High Safety - The airspace will maintain or enhance current levels of safety The exsiting airspace is demonstrably safe. This option represents the baseline for safety against which other options will be assessed.	MET	no significant safety issues identified
Design Principle 2: Resilience — High Operational - The proposed airspace will maintain or enhance operational resilience of the ATC network. Resilience maintained but not enhanced. No improvement from today's operation.	PARTIAL	No change
Design principle 3: Capacity — High Operational - The proposed airspace design will yield the greatest capacity benefits from systemisation. Existing airway is unlikely to support the forecast traffic growth. Lack of systemisation means that as traffic loading increases, tactical intervention will increase and become more difficult to resolve conflictions.	NOT	Design option Unable to support the forecast traffic loading
Design principle 4: Interface — High Technical - The ScTMA airspace design will provide a compatible and optimised interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network. No Change - no impact.	MET	Minimal or no changes required for compatibility with ATS Route Network
Design principle 5: Economic — Medium Economic - The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route. (Note: This includes track mileage / fuel burn / route charges) No Change - no impact.	PARTIAL	Economic performance as per today
Design principle 6: Environmental — Medium Environmental - The proposed ScTMA airspace will facilitate the reduction of CO2 emissions along the entire route. No Change - no impact.	PARTIAL	CO2 emissions as per today
Design principle 7: Environmental — Low Environmental - Minimise environmental impact to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsors ACP). No change - no impact.	MET	No change in noise impacts below 7000ft
Design principle 8: MoD — Medium Operational - The ScTMA airspace should be compatible with the requirements of the MoD. No change - no impact.	MET	No impact or positive impact
Design principle 9: GA — Medium Operational - The impacts on GA and other civilian airspace users due to ScTMA should be minimised. (Note: This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures.) No change - no impact.	MET	No impact or positive impact
Design principle 10: CAS — Medium Technical -The classification and volume of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users. (Note: This may include releasing CAS as appropriate.) No change - no impact.	MET	No increase (or reduction in) CAS required
Design principle 11: PBN — High Technical - The route network linking airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. (Note: Where appropriate, the use of RNP should be considered if the fleet mix can support it.) Existing ATS route is RNAV5	MET	All routes needed are accommodated or the highest RNAV standards used
Design principle 12: AMS — High Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. (Note: The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable - the need to maximise the utilisation of existing runway capacity) Existing airspace partially aligns with the AMS but does not lead to sustainable growth.	PARTIAL	Partially aligned with the AMS
Design principle 13: CCO/CCD — Medium The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft. No change - CCO and CCD as per todays operation	PARTIAL	CCO and CDO as per today

Conclusion:
The Do nothing Option represents no change, and will not be progressed.

ANNEX D

Option 1: Bidirectional route with lowered bases	REJECT	Assessmt matrix ref
No change to the lateral tracks of the existing ATS route. However, the base of the existing CAS will be lowered to facilitate optimised arrival and departure profiles to/from the ScTMA		
Design Principle 1: Safety — High Safety - The airspace will maintain or enhance current levels of safety No safety issues have been identified with this option.	MET	no significant safety issues identified
Design Principle 2: Resilience — High Operational - The proposed airspace will maintain or enhance operational resilience of the ATC network. Option 1 improves resilience by making arrivals more efficient. The additional CAS provides additional options to absorb delay if needed.	MET	Better than Current
Design principle 3: Capacity — High Operational - The proposed airspace design will yield the greatest capacity benefits from systemisation. Aditional CAS increases offers a slight increase in capacity by enabling a reduction in controller workload though improved arrival profiles.	PARTIAL	Design option supports the forecast traffic loading but no capacity benefit
Design principle 4: Interface — High Technical - The ScTMA airspace design will provide a compatible and optimised interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network. Option 1 provides a compatable interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network	MET	Minimal or no changes required for compatibility with ATS Route Network
Design principle 5: Economic — Medium Economic - The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route. (Note: This includes track mileage / fuel burn / route charges) Improved arrival profiles will lead to an improved economic performance	MET	Economic performance increased
Design principle 6: Environmental — Medium Environmental - The proposed ScTMA airspace will facilitate the reduction of CO2 emissions along the entire route. Improved arrival profiles will lead to a reduction in CO_2 emissions for arrival aircraft	MET	CO2 emissions reduced
Design principle 7: Environmental — Low Environmental - Minimise environmental impact to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsors ACP). No change - no impact.	MET	No change in noise impacts below 7000ft
Design principle 8: MoD — Medium Operational - The ScTMA airspace should be compatible with the requirements of the MoD. Option 1 requires additional CAS which may encroach on airspace used by the MoD. MoD access will be maintained as required.	PARTIAL	Minor impact and not safety critical
Design principle 9: GA — Medium Operational - The impacts on GA and other civilian airspace users due to ScTMA should be minimised. (Note: This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures.) Option 1 does require additional CAS however, this airspace is above FL100 and not likely used by GA	PARTIAL	Minor impact and not safety critical
Design principle 10: CAS — Medium Technical -The classification and volume of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users. (Note: This may include releasing CAS as appropriate.) Option 1 requires a small increase in CAS volume	PARTIAL	Small increase in CAS volume required
Design principle 11: PBN — High Technical - The route network linking airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. (Note: Where appropriate, the use of RNP should be considered if the fleet mix can support it.) Appropriate RNAV specification is used	MET	All routes needed are accommodated or the highest RNAV standards used
Design principle 12: AMS — High Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. (Note: The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable - the need to maximise the utilisation of existing runway capacity) This option does align with the AMS	MET	Aligned with the AMS
Design principle 13: CCO/CCD — Medium The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft. This option will offer a positive improvement to CDO but not CCO	PARTIAL	CCO and CDO as per today

Conclusion:

The option of lowering the bases offers a slight increase in capacity as well as an economic and environmental benefit. This benefit is off set by the minor impact on the MoD and GA through increasing the volume of CAS. Whilst this option offers some benefits, aircraft arriving and departing the ScTMA are not deconflicted and could require ATCO intervention to resolve conflictions. As such this option is not as good as an option that makes use of systemisation

5 DP's (1 high) were only partially met and hence is option is Rejected.

Option 2: Systemised routes		REJECT	Assessmt matrix ref
Introduction of a systemised ATS route structure providing assured separation between arrivals and departures.			
Design Principle 1: Safety Safety - The airspace will maintain or enhance current levels of safety No safety issues have been identified with this option.	High	MET	no significant safety issues identified
Design Principle 2: Resilience Operational - The proposed airspace will maintain or enhance operational resilience of the ATC network. Option 2 improves resilience by deconflicting arrivals and departures through systemisation.	High	MET	Better than Current
Design principle 3: Capacity Operational - The proposed airspace design will yield the greatest capacity benefits from systemisation. Capacity is increased by deconflicting arrivals and departures, reducing controller workload	High	MET	Design option decreases ATCO workload
Design principle 4: Interface Technical - The ScTMA airspace design will provide a compatible and optimised interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network. Option 2 provides a compatable interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network	High	MET	Minimal or no changes required for compatibility with ATS Route Network
Design principle 5: Economic Economic - The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route. (Note: This includes track mileage / fuel burn / route charges) Systemising the airspace increases the track milege for either the arrivals or departures and decreases it for the other. The net impact is no change	Medium	PARTIAL	Economic performance as per today
Design principle 6: Environmental Environmental - The proposed ScTMA airspace will facilitate the reduction of CO2 emissions along the entire route. Systemising the airspace increases the CO_2 emissions for either the arrivals or departures and decreases it for the other. The net impact is no	Medium	PARTIAL	CO2 emissions as per today
Design principle 7: Environmental Environmental - Minimise environmental impact to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsors ACP). No change - no impact.	Low	MET	No change in noise impacts below 7000ft
Design principle 8: MoD Operational - The ScTMA airspace should be compatible with the requirements of the MoD. Option 2 may require additional CAS to comply with the spacing requirements of a systemised airspace structure. This may encroach on airspace used by the MoD.	Medium	PARTIAL	Minor impact and not safety critical
Design principle 9: GA Operational - The impacts on GA and other civilian airspace users due to ScTMA should be minimised. (Note: This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures.) Option 2 may require additional CAS to comply with the spacing requirements of a systemised airspace structure. However, this additional airspace will be above FL100 and is not likely used by GA	Medium	PARTIAL	Minor impact and not safety critical
Design principle 10: CAS Technical -The classification and volume of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users. (Note: This may include releasing CAS as appropriate.) Option 2 may require a small increase in CAS volume	Medium	PARTIAL	Small increase in CAS volume required
Design principle 11: PBN Technical - The route network linking airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. (Note: Where appropriate, the use of RNP should be considered if the fleet mix can support it.) Appropriate RNAV specification is used	High	MET	All routes needed are accommodated or an appropriate RNAV standards used
Design principle 12: AMS Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. (Note: The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable - the need to maximise the utilisation of existing runway capacity) This option does align with the AMS	High	MET	Aligned with the AMS
Design principle 13: CCO/CCD The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft. This option will not benefit CCO or CDO	Medium	PARTIAL	CCO and CDO as per today

Conclusion:
The introduction of a systemised airspace structure in the South-eastern element offers an increase in safety as well as providing benefits in capacity, resilience, economic and environmental benefit. However, the cost of this benefit is the potential requirement to widen the CTA's above FL100 to facilitate the
introduction of these routes, potentially impacting the MoD and GA. Whilst this option does provide the aforementioned benefits, it does not offer any benefit to CDO which is limited by the base of CAS.
5 DP's (5 Med) were only partially met and hence is option is Rejected.

Option 3: Systemised routes with lowered bases	ACCEPT & PROGRESS	Assessmt matrix ref
Introduction of a systemised ATS route structure providing assured separation between arrivals and departures. This option includes the lowering of controlled airspace to facilitate		
Design Principle 1: Safety — High Safety - The airspace will maintain or enhance current levels of safety No safety issues have been identified with this option.	MET	no significant safety issues identified
Design Principle 2: Resilience — High Operational - The proposed airspace will maintain or enhance operational resilience of the ATC network. Option 3 improves resilience by deconfliccting arrivals and departures through systemisation.	MET	Better than Current
Design principle 3: Capacity — High Operational - The proposed airspace design will yield the greatest capacity benefits from systemisation. Capacity is increased by deconflicting arrivals and departures, reducing controller workload	MET	Design option decreases ATCO workload
Design principle 4: Interface — High Technical - The ScTMA airspace design will provide a compatible and optimised interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network. Option 3 provides a compatable interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network	MET	Minimal or no changes required for compatibility with FRA
Design principle 5: Economic — Medium Economic - The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route. (Note: This includes track mileage / fuel burn / route charges) Systemising the airspace increases the track milege for either the arrivals or departures and decreases it for the other. However, by lowering the bases aircraft have an improved descent profile reducing fuel burn.	MET	Economic performance increased
Design principle 6: Environmental — Medium Environmental - The proposed ScTMA airspace will facilitate the reduction of CO2 emissions along the entire route. Systemising the airspace increases the CO_2 emissions for either the arrivals or departures and decreases it for the other. However, by lowering the bases aircraft have an improved descent profile reducing CO_2 emissions.	MET	CO2 emissions reduced
Design principle 7: Environmental — Low Environmental - Minimise environmental impact to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsors ACP). No change - no impact.	MET	No change in noise impacts below 7000ft
Design principle 8: MoD — Medium Operational - The ScTMA airspace should be compatible with the requirements of the MoD. Option 3 requires additional CAS which may encroach on airspace used by the MoD. MoD access will be maintained as required.	PARTIAL	Minor impact and not safety critical
Design principle 9: GA — Medium Operational - The impacts on GA and other civilian airspace users due to ScTMA should be minimised. (Note: This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures.) Option 3 does require additional CAS however, this airspace is above FL100 and not likely used by GA	PARTIAL	Minor impact and not safety critical
Design principle 10: CAS — Medium Technical -The classification and volume of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users. (Note: This may include releasing CAS as appropriate.) Option 3 requires a small increase in CAS volume	PARTIAL	Small increase in CAS volume required
Design principle 11: PBN — High Technical - The route network linking airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. (Note: Where appropriate, the use of RNP should be considered if the fleet mix can support it.) Appropriate RNAV specification is used	MET	All routes needed are accommodated or an appropriate RNAV standards used
Design principle 12: AMS — High Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. (Note: The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable - the need to maximise the utilisation of existing runway capacity) This option does align with the AMS	MET	Partially aligned with the AMS
Design principle 13: CCO/CCD — Medium The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft. This option will offer a positive improvement to CDO but not CCO	MET	Positive impact on CCO and CDO

Conclusion:
The introduction of a systemised airspace structure with lowered bases in the South-eastern element offers an increase in safety as well as providing benefits in capacity, resilience, fuel burn and CO_2
emissions. However, the cost of this benefit is the requirement for additional CAS which may impact MoD and GA operations.
This option is considered a promising candidate and has been **Progressed** to the next Stage.

ANNEX D

Southern Element Conclusion and Shortlist

The design principle evaluation of each design option presented on the previous pages and are summarised in the table below.

Design / Option Name:	Option 0: Baseline (do nothing)	Option 1: Bidirectional routes	Option 2: Bidirectional routes including a review of CAS bases	Option 3: Systemised routes orientated according to traffic flow	Option 4: Systemised routes orientated according to traffic flow including a review of CAS bases	Option 5: Systemised routes orientated by ScTMA airports	Option 6: Systemised routes orientated by ScTMA airports including a review of CAS bases
Accept / Reject	REJECT	REJECT	REJECT	ACCEPT & PROGRE	ACCEPT & PROGRESS	REJECT	REJECT
Design Principle 1: Safety — High Safety - The airspace will maintain or enhance current levels of safety	MET	NOT	NOT	MET	MET	MET	MET
Design Principle 2: Resilience — High Operational - The proposed airspace will maintain or enhance operational resilience of the ATC network.	PARTIAL	NOT	NOT	MET	MET	NOT	NOT
Design Principle 3: Capacity — High Operational - The proposed airspace design will yield the greatest capacity benefits from systemisation.	PARTIAL	NOT	NOT	MET	MET	NOT	NOT
Design Principle 4: Interface — High Technical - The ScTMA airspace design will provide a compatible and optimised interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network.	PARTIAL	NOT	NOT	MET	MET	NOT	NOT
Design Principle 5: Economic — Medium Economic - The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route. (Note: This includes track mileage / fuel burn / route charges)	PARTIAL	MET	MET	MET	MET	MET	MET
Design Principle 6: Environmental — Medium Environmental - The proposed ScTMA airspace will facilitate the reduction of CO2 emissions along the entire route.	PARTIAL	MET	MET	MET	MET	MET	MET
Design Principle 7: Environmental — Low Environmental - Minimise environmental impact to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsors ACP).	MET	MET	MET	MET	MET	MET	MET
Design Principle 8: MoD — Medium Operational - The ScTMA airspace should be compatible with the requirements of the MoD.	MET	PARTIAL	PARTIAL	MET	PARTIAL	MET	PARTIAL
Design Principle 9: GA — Medium Operational - The impacts on GA and other civilian airspace users due to ScTMA should be minimised. (Note: This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures.)	MET	MET	MET	MET	MET	MET	MET
Design Principle 10: CAS — Medium Technical -The classification and volume of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users. (Note: This may include releasing CAS as appropriate.)	MET	MET	MET	MET	MET	MET	MET
Design Principle 11: PBN — High Technical - The route network linking airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. (Note: Where appropriate, the use of RNP should be considered if the fleet mix can support it.)	MET	MET	MET	MET	MET	MET	MET
Design Principle 12: AMS — High Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. (Note: The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable - the need to maximise the utilisation of existing runway capacity)	PARTIAL	NOT	NOT	MET	MET	MET	MET
Design Principle 13: CCO/CCD — Medium The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft.	PARTIAL	NOT	NOT	PARTIAL	PARTIAL	PARTIAL	PARTIAL

Progression criteria: Options having any High Design Principle which are Not Met (red) or 2 or more Med Design Principle Not Met or greater than 5 Design Principles partially met have been rejected.

Next Steps

Options 3 & 4 will be formally appraised under the Stage 2, Step 2B Options Appraisal (Phase 1 Initial), including Safety Assessment.

Option 0: Baseline (do nothing)	REJECT	Assessmt matrix ref
This option represents the existing airspace design, i.e. the "do nothing" option.		
Design Principle 1: Safety — High Safety - The airspace will maintain or enhance current levels of safety The exsiting airspace is demonstrably safe. This option represents the baseline for safety against which other options will be assessed.	MET	no significant safety issues identified
Design Principle 2: Resilience — High Operational - The proposed airspace will maintain or enhance operational resilience of the ATC network. Resilience maintained but not enhanced. No improvement from today's operation.	PARTIAL	No change
Design principle 3: Capacity — High Operational - The proposed airspace design will yield the greatest capacity benefits from systemisation. Existing airway is likely to support the forecast traffic growth and current orientation of traffic reduces conflictions.	PARTIAL	Design option supports the forecast traffic loading but no capacity benefit
Design principle 4: Interface — High Technical - The ScTMA airspace design will provide a compatible and optimised interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network. This option does not provide connectivity to FRA as this has not been introduced yet.	PARTIAL	Significant changes with FRA required for compatability
Design principle 5: Economic — Medium Economic - The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route. (Note: This includes track mileage / fuel burn / route charges) No Change - no impact.	PARTIAL	Economic performance as per today
Design principle 6: Environmental — Medium Environmental - The proposed ScTMA airspace will facilitate the reduction of CO2 emissions along the entire route. No Change - no impact.	PARTIAL	CO2 emissions as per today
Design principle 7: Environmental — Low Environmental - Minimise environmental impact to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsors ACP). No Change - no impact.	MET	No change in noise impacts below 7000ft
Design principle 8: MoD — Medium Operational - The ScTMA airspace should be compatible with the requirements of the MoD. No Change - no impact.	MET	No impact or positive impact
Design principle 9: GA — Medium Operational - The impacts on GA and other civilian airspace users due to ScTMA should be minimised. (Note: This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures.) No Change - no impact.	MET	No impact or positive impact
Design principle 10: CAS — Medium Technical -The classification and volume of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users. (Note: This may include releasing CAS as appropriate.) No Change - no impact.	MET	No increase (or reduction in) CAS required
Design principle 11: PBN — High Technical - The route network linking airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. (Note: Where appropriate, the use of RNP should be considered if the fleet mix can support it.) Existing ATS routes are RNAV5 or greater	MET	All routes needed are accommodated or the highest RNAV standards used
Design principle 12: AMS — High Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. (Note: The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable - the need to maximise the utilisation of existing runway capacity) Existing airspace partially aligns with the AMS but does not lead to sustainable growth or make efficient use of the airspace.	PARTIAL	Partially aligned with the AMS
Design principle 13: CCO/CCD — Medium The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft. No change - CCO and CCD as per todays operation	PARTIAL	CCO and CDO as per today

Conclusion:
The Do nothing Option represents no change, and will not be progressed.

Option 1: Bidirectional routes	REJECT	Assessmt matrix ref
Introduction of new and review of existing ATS route structure to provide improved connectivity between the ScTMA central element and the southern ATS route network. This option will not change the base existing CAS.		
Design Principle 1: Safety — High Safety - The airspace will maintain or enhance current levels of safety Option 1 will lead to a reduction in safety by introducing conflictions between arriving and departing aircraft.	NOT	Unlikely to pass a safety case
Design Principle 2: Resilience — High Operational - The proposed airspace will maintain or enhance operational resilience of the ATC network. Option 1 will lead to a reduction in resilience by not seperating arrival and departure aircraft and therefore reducing recovery optons.	NOT	Worse than current
Design principle 3: Capacity — High Operational - The proposed airspace design will yield the greatest capacity benefits from systemisation. Increased conflictions and poor interface with southern airspace will result in inccreased conroller workload reducing capacity	NOT	Design option increases ATCO workload
Design principle 4: Interface — High Technical - The ScTMA airspace design will provide a compatible and optimised interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network. Option 1 does not provide a compatable interface with the ATS network to the south of this change	NOT	Option incompatible with ATS Route Network
Design principle 5: Economic — Medium Economic - The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route. (Note: This includes track mileage / fuel burn / route charges) Bidirectional routes will reduce the track milage of each route leading to a reduction in fuel burn	MET	Economic performance increased
Design principle 6: Environmental — Medium Environmental - The proposed ScTMA airspace will facilitate the reduction of CO2 emissions along the entire route. Bidirectional routes will reduce the track milage of each route leading to a reduction in CO_2 emissions	MET	CO2 emissions reduced
Design principle 7: Environmental — Low Environmental - Minimise environmental impact to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsors ACP). No change - no impact.	MET	No change in noise impacts below 7000ft
Design principle 8: MoD — Medium Operational - The ScTMA airspace should be compatible with the requirements of the MoD. The increase in workload would hinder the operation of the DCS radar corridor impacting MoD operations.	PARTIAL	Minor impact and not safety critical
Design principle 9: GA — Medium Operational - The impacts on GA and other civilian airspace users due to ScTMA should be minimised. (Note: This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures.) Option 1 is contained within existing CAS so GA operations will not be impacted.	MET	No impact or positive impact
Design principle 10: CAS — Medium Technical -The classification and volume of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users. (Note: This may include releasing CAS as appropriate.) Option 1 does not require additional CAS	MET	No increase (or reduction in) CAS required
Design principle 11: PBN — High Technical - The route network linking airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. (Note: Where appropriate, the use of RNP should be considered if the fleet mix can support it.) Appropriate RNAV specification is used	MET	All routes are accommodated howev er an increase in airspace volume is required due to lower
Design principle 12: AMS — High Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. (Note: The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable - the need to maximise the utilisation of existing runway capacity) This option decreases safety and therefore can not align with the AMS	NOT	Not aligned with the AMS
Design principle 13: CCO/CCD — Medium The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft. Increased conflicts between arrival and departure aircraft will lead to a negative impact on CCO and CDO	NOT	Negative impact on CCO and CDO compared with today

Conclusion:
The introduction of parallel bidirectional routes within the southern element offers a Fuel and CO_2 benefit, it does so at the expense of safety and is not compatible with the route network in the south.
This option would also increase controller workload which further reduces capacity. As such this option is not as good as the baseline or one that makes use of systemisation.
6DP's (5 high) were not met and hence this option is Rejected.

Option 2: Bidirectional routes including a review of CAS bases	REJECT	Assessmt matrix ref
Introduction of new and review of existing ATS route structure to provide improved connectivity between the ScTMA central element and the southern ATS route network. The bases of CAS will be reviewed and amended to facilitate optimised arrival and departure profiles to/from the ScTMA Airfields.		
Design Principle 1: Safety — High Safety - The airspace will maintain or enhance current levels of safety Option 2 will lead to a reduction in safety by introducing conflictions between arriving and departing aircraft.	NOT	Unlikely to pass a safety case
Design Principle 2: Resilience — High Operational - The proposed airspace will maintain or enhance operational resilience of the ATC network. Option 1 will lead to a reduction in resilience by not seperating arrival and departure aircraft and therefore reducing recovery optons.	NOT	Worse than current
Design principle 3: Capacity — High Operational - The proposed airspace design will yield the greatest capacity benefits from systemisation. Increased conflictions will result in increased conroller workload reducing capacity	NOT	Design option increases ATCO workload
Design principle 4: Interface — High Technical - The ScTMA airspace design will provide a compatible and optimised interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network. Option 2 does not provide a compatable interface with the ATS network to the south of this change	NOT	Option incompatible with ATS Route Network
Design principle 5: Economic — Medium Economic - The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route. (Note: This includes track mileage / fuel burn / route charges) Bidirectional routes will reduce the track milage of each route leading to a reduction in fuel burn	MET	Economic performance increased
Design principle 6: Environmental — Medium Environmental - The proposed ScTMA airspace will facilitate the reduction of CO2 emissions along the entire route. Bidirectional routes will reduce the track milage of each route leading to a reduction in CO_2 emissions	MET	CO2 emissions reduced
Design principle 7: Environmental — Low Environmental - Minimise environmental impact to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsors ACP). No change - no impact.	MET	No change in noise impacts below 7000ft
Design principle 8: MoD — Medium Operational - The ScTMA airspace should be compatible with the requirements of the MoD. As well as reviewing the CAS volume, the increase in workload would hinder the operation of the DCS radar corridor impacting MoD operations.	PARTIAL	Minor impact and not safety critical
Design principle 9: GA — Medium Operational - The impacts on GA and other civilian airspace users due to ScTMA should be minimised. (Note: This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures.) Option 2 will review the base of CAS. These changes are likely to be above FL100 and are therefore unlikely to be used by GA	MET	No impact or positive impact
Design principle 10: CAS — Medium Technical -The classification and volume of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users. (Note: This may include releasing CAS as appropriate.) Option 2 will review the base of CAS. Additional airspace ay be required and existing airspace will be released where able. The overal change is likely to neutral or a reduction in total volume	MET	No increase (or reduction in) CAS required
Design principle 11: PBN — High Technical - The route network linking airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. (Note: Where appropriate, the use of RNP should be considered if the fleet mix can support it.) Appropriate RNAV specification is used	MET	All routes needed are accommodated or the highest RNAV standards used
Design principle 12: AMS — High Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. (Note: The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable - the need to maximise the utilisation of existing runway capacity) This option decreases safety and therefore can not align with the AMS	NOT	Not aligned with the AMS
Design principle 13: CCO/CCD — Medium The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft. Lowering the base of CAS allows for a more efficient CDO however, Increased conflicts between arrival and departure aircraft will lead to a negative impact on both CCO and CDO	NOT	Negative impact on CCO and CDO compared with today

Conclusion:
The introduction of parallel bidirectional routes within the southern element offers a Fuel and CO_2 benefit, it does so at the expense of safety and is not compatible with the route network in the south.
This option would also increase controller workload which further reduces capacity. The review of the base of CAS allows for improved CDO and the release of underutilised CAS but does not mitigate against the disbenefit caused by introducing bidirectional routes within this element. As such this option is not as good as the baseline or one that makes use of systemisation. 6DP's (5 high) were not met and hence this option is Rejected.

Option 3: Systemised routes orientated according to traffic flow	ACCEPT & PROGRESS	Assessmt matrix ref
Introduction of a systemised route structure connecting the ScTMA central element to the Southern ATS route network. Traffic flows will be orientated with Northbound routes on one side of the airspace and South bound rotes on the other. This option will not change the base existing CAS.		
Design Principle 1: Safety — High Safety - The airspace will maintain or enhance current levels of safety No safety issues have been identified with this option.	MET	no significant safety issues identified
Design Principle 2: Resilience — High Operational - The proposed airspace will maintain or enhance operational resilience of the ATC network. Option 3 improves disruption recovery by providing additional systemised departure and arrival routes.	MET	Better than Current
Design principle 3: Capacity — High Operational - The proposed airspace design will yield the greatest capacity benefits from systemisation. Option 3 improves disruption recovery by providing additional systemised departure and arrival routes and reduces controller workload.	MET	Design option decreases ATCO workload
Design principle 4: Interface — High Technical - The ScTMA airspace design will provide a compatible and optimised interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network. Option 3 provides connectivity compatable with the surrounding airspace.	MET	Minimal or no changes required for compatibility with ATS Route Network
Design principle 5: Economic — Medium Economic - The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route. (Note: This includes track mileage / fuel burn / route charges) Option 3 provides more direct routes reducing fuel burn	MET	Economic performance increased
Design principle 6: Environmental — Medium Environmental - The proposed ScTMA airspace will facilitate the reduction of CO2 emissions along the entire route. Option 3 provides more direct routes reducing CO_2 emissions	MET	CO2 emissions reduced
Design principle 7: Environmental — Low Environmental - Minimise environmental impact to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsors ACP). No change - no impact.	MET	No change in noise impacts below 7000ft
Design principle 8: MoD — Medium Operational - The ScTMA airspace should be compatible with the requirements of the MoD. No change - no impact.	MET	No impact or positive impact
Design principle 9: GA — Medium Operational - The impacts on GA and other civilian airspace users due to ScTMA should be minimised. (Note: This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures.) No change - no impact.	MET	No impact or positive impact
Design principle 10: CAS — Medium Technical -The classification and volume of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users. (Note: This may include releasing CAS as appropriate.) No change - no impact.	MET	No increase (or reduction in) CAS required
Design principle 11: PBN — High Technical - The route network linking airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. (Note: Where appropriate, the use of RNP should be considered if the fleet mix can support it.) Any additional routes will be designed to an appropriate RNAV standard.	MET	All routes needed are accommodated or the highest RNAV standards used
Design principle 12: AMS — High Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. (Note: The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable - the need to maximise the utilisation of existing runway capacity) This option does align with the AMS	MET	Aligned with the AMS
Design principle 13: CCO/CCD — Medium The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft. This option does not enable improved CCO or CDO	PARTIAL	CCO and CDO as per today

Conclusion:

The introduction of a parallel systemised route structure with arrivals on one side of the airway and departures on the other within the southern element offers a Fuel and CO_2 benefit to operators and increases network capacity and resilience

This option is considered a promising candidate and has been Progressed to the next Stage.

Option 4: Systemised routes orientated according to traffic flow including a review of CAS bases	ACCEPT & PROGRESS	Assessmt matrix ref
Introduction of a systemised route structure connecting the ScTMA central element to the Southern ATS route network. Traffic flows will be orientated with Northbound routes on one side of the airspace and South bound rotes on the other. The bases of CAS will be reviewed and amended to facilitate optimised arrival and departure profiles to/from the ScTMA Airfields.		
Design Principle 1: Safety — High Safety - The airspace will maintain or enhance current levels of safety No safety issues have been identified with this option.	MET	no significant safety issues identified
Design Principle 2: Resilience — High Operational - The proposed airspace will maintain or enhance operational resilience of the ATC network. Option 4 improves disruption recovery by providing additional systemised departure and arrival routes.	MET	Better than Current
Design principle 3: Capacity — High Operational - The proposed airspace design will yield the greatest capacity benefits from systemisation. Option 4 improves disruption recovery by providing additional systemised departure and arrival routes and reduces controller workload.	MET	Design option decreases ATCO workload
Design principle 4: Interface — High Technical - The ScTMA airspace design will provide a compatible and optimised interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network. Option 4 provides connectivity compatable with the surrounding airspace.	MET	Minimal or no changes required for compatibility with ATS Route Network
Design principle 5: Economic — Medium Economic - The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route. (Note: This includes track mileage / fuel burn / route charges) Option 4 provides more direct routes reducing fuel burn	MET	Economic performance increased
Design principle 6: Environmental — Medium Environmental - The proposed ScTMA airspace will facilitate the reduction of CO2 emissions along the entire route. Option 4 provides more direct routes reducing CO_2 emissions	MET	CO2 emissions reduced
Design principle 7: Environmental — Low Environmental - Minimise environmental impact to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsors ACP). No change - no impact.	MET	No change in noise impacts below 7000ft
Design principle 8: MoD — Medium Operational - The ScTMA airspace should be compatible with the requirements of the MoD. Option 4 reviews the base of CAS which may impact MoD operations	PARTIAL	Minor impact and not safety critical
Design principle 9: GA — Medium Operational - The impacts on GA and other civilian airspace users due to ScTMA should be minimised. (Note: This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures.) Option 4 reviews the base of CAS which could lower or raise the published levels. Any changes are likely to be above FL100 in airspace not used	MET	No impact or positive impact
Design principle 10: CAS — Medium Technical -The classification and volume of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users. (Note: This may include releasing CAS as appropriate.) Option 4 will review the base of CAS. Additional airspace ay be required and existing airspace may be released where able. The overal change is expected to neutral or a reduction in total volume	MET	No increase (or reduction in) CAS required
Design principle 11: PBN — High Technical - The route network linking airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. (Note: Where appropriate, the use of RNP should be considered if the fleet mix can support it.) Any additional routes will be designed to an appropriate RNAV standard.	MET	All routes needed are accommodated or the highest RNAV standards used
Design principle 12: AMS — High Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. (Note: The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable - the need to maximise the utilisation of existing runway capacity) This option does align with the AMS	MET	Partially aligned with the AMS
Design principle 13: CCO/CCD — Medium The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft. This option enables improved CDO but does not enable improved CCO.	PARTIAL	CCO and CDO as per today

Conclusion:
The introduction of a parallel systemised route structure with arrivals on one side of the airway and departures on the other within the southern element offers a Fuel and CO_2 benefit to operators and increases network capacity and resilience. Reviewing the base of CAS will facilitate improved CDO and potentially release additional CAS.
This option is considered a promising candidate and has been **Progressed** to the next Stage.

Option 5: Systemised routes orientated by ScTMA airports	REJECT	Assessmt matrix ref
Introduction of a systemised route structure connecting the ScTMA central element to the Southern ATS route network. Traffic flows will be orientated with routes serving Glasgow/ Prestwick airports on one side of the airspace and routes serving Edinburgh on the other. This option will not change the base existing CAS.		
Design Principle 1: Safety — High Safety - The airspace will maintain or enhance current levels of safety No safety issues have been identified with this option.	MET	no significant safety issues identified
Design Principle 2: Resilience — High Operational - The proposed airspace will maintain or enhance operational resilience of the ATC network. Option 5 will lead to a reduction in resilience by not seperating arrival and departure aircraft and therefore reducing recovery optons.	NOT	Worse than current
Design principle 3: Capacity — High Operational - The proposed airspace design will yield the greatest capacity benefits from systemisation. Option 5 will lead to an increase in controlloer workload in the south of the change to enable the proposed structure to link with the extant network. This will lead to a reduction in capacity	NOT	Design option increases ATCO workload
Design principle 4: Interface — High Technical - The ScTMA airspace design will provide a compatible and optimised interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network. Option 5 does not provide a compatable interface with the ATS network to the south of this change	NOT	Option incompatible with ATS Route Network
Design principle 5: Economic — Medium Economic - The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route. (Note: This includes track mileage / fuel burn / route charges) Option 5 provides more direct routes reducing fuel burn	MET	Economic performance increased
Design principle 6: Environmental — Medium Environmental - The proposed ScTMA airspace will facilitate the reduction of CO2 emissions along the entire route. Option 5 provides more direct routes reducing CO_2 emissions	MET	CO2 emissions reduced
Design principle 7: Environmental — Low Environmental - Minimise environmental impact to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsors ACP). No change - no impact.	MET	No change in noise impacts below 7000ft
Design principle 8: MoD — Medium Operational - The ScTMA airspace should be compatible with the requirements of the MoD. No change - no impact.	MET	No impact or positive impact
Design principle 9: GA — Medium Operational - The impacts on GA and other civilian airspace users due to ScTMA should be minimised. (Note: This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures.) No change - no impact.	MET	No impact or positive impact
Design principle 10: CAS — Medium Technical -The classification and volume of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users. (Note: This may include releasing CAS as appropriate.) No change - no impact.	MET	No increase (or reduction in) CAS required
Design principle 11: PBN — High Technical - The route network linking airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. (Note: Where appropriate, the use of RNP should be considered if the fleet mix can support it.) Any additional routes will be designed to an appropriate RNAV standard.	MET	All routes needed are accommodated or the highest RNAV standards used
Design principle 12: AMS — High Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. (Note: The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable - the need to maximise the utilisation of existing runway capacity) This option does align with the AMS	MET	Aligned with the AMS
Design principle 13: CCO/CCD — Medium The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft. This option does not enable improved CCO or CDO	PARTIAL	CCO and CDO as per today

Conclusion:
The introduction of a parallel systemised route structure with alternating north/ southbound traffic flows within the southern element offers a Fuel and CO2 benefit to operators. However, alternating northerly and southerly flows increase controller workload and decrease network capacity and resilience.
3DP's (3 high) were not met and hence this option is **Rejected**.

Option 6: Systemised routes orientated by ScTMA airports including a review of CAS bases	REJECT	Assessmt matrix ref
Introduction of a systemised route structure connecting the ScTMA central element to the Southern ATS route network. Traffic flows will be orientated with routes serving Glasgow/ Prestwick airports on one side of the airspace and routes serving Edinburgh on the other. The bases of CAS will be reviewed and amended to facilitate optimised arrival and departure profiles to/from the ScTMA Airfields.		
Design Principle 1: Safety — High Safety - The airspace will maintain or enhance current levels of safety No safety issues have been identified with this option.	MET	no significant safety issues identified
Design Principle 2: Resilience — High Operational - The proposed airspace will maintain or enhance operational resilience of the ATC network. Option 6 will lead to a reduction in resilience by not seperating arrival and departure aircraft and therefore reducing recovery optons.	NOT	Worse than current
Design principle 3: Capacity — High Operational - The proposed airspace design will yield the greatest capacity benefits from systemisation. Option 6 will lead to an increase in controlloer workload in the south of the change to enable the proposed structure to link with the extant network. This will lead to a reduction in capacity	NOT	Design option increases ATCO workload
Design principle 4: Interface — High Technical - The ScTMA airspace design will provide a compatible and optimised interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network. Option 6 does not provide a compatable interface with the ATS network to the south of this change	NOT	Significant changes with ATS Route Network required for compatability
Design principle 5: Economic — Medium Economic - The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route. (Note: This includes track mileage / fuel burn / route charges) Option 6 provides more direct routes reducing fuel burn	MET	Economic performance increased
Design principle 6: Environmental — Medium Environmental - The proposed ScTMA airspace will facilitate the reduction of CO2 emissions along the entire route. Option 6 provides more direct routes reducing CO_2 emissions	MET	CO2 emissions reduced
Design principle 7: Environmental — Low Environmental - Minimise environmental impact to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsors ACP). No change - no impact.	MET	No change in noise impacts below 7000ft
Design principle 8: MoD — Medium Operational - The ScTMA airspace should be compatible with the requirements of the MoD. Option 6 reviews the base of CAS which may impact MoD operations	PARTIAL	Minor impact and not safety critical
Design principle 9: GA — Medium Operational - The impacts on GA and other civilian airspace users due to ScTMA should be minimised. (Note: This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures.) Option 6 reviews the base of CAS which could lower or raise the published levels. Any changes are likely to be above FL100 in airspace not used	MET	No impact or positive impact
Design principle 10: CAS — Medium Technical -The classification and volume of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users. (Note: This may include releasing CAS as appropriate.) Option 6 will review the base of CAS. Additional airspace ay be required and existing airspace may be released where able. The overal change is expected to neutral or a reduction in total volume	MET	No increase (or reduction in) CAS required
Design principle 11: PBN — High Technical - The route network linking airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. (Note: Where appropriate, the use of RNP should be considered if the fleet mix can support it.) Any additional routes will be designed to an appropriate RNAV standard.	MET	All routes needed are accommodated or the highest RNAV standards used
Design principle 12: AMS — High Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. (Note: The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable - the need to maximise the utilisation of existing runway capacity) This option does align with the AMS	MET	Aligned with the AMS
Design principle 13: CCO/CCD — Medium The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft. This option enables improved CDO but does not enable improved CCO.	PARTIAL	CCO and CDO as per today

Conclusion:
The introduction of a parallel systemised route structure with alternating north/ southbound traffic flows within the southern element offers a Fuel and CO2 benefit to operators. However, alternating northerly and southerly flows increase controller workload and decrease network capacity and resilience. Reviewing the base of CAS will facilitate improved CDO and potentially release additional CAS.
3DP's (3 high) were not met and hence this option is Rejected.

ANNEX D

South Western Element Conclusion and Shortlist

The design principle evaluation of each design option presented on the previous pages and are summarised in the table below.

Design / Option Name:	Option 0: Baseline (do nothing)	Option 1: Systemised routes
Accept / Reject	REJECT	ACCEPT & PROGRE
Design Principle 1: Safety — High Safety - The airspace will maintain or enhance current levels of safety	MET	MET
Design Principle 2: Resilience — High Operational - The proposed airspace will maintain or enhance operational resilience of the ATC network.	PARTIAL	MET
Design Principle 3: Capacity — High Operational - The proposed airspace design will yield the greatest capacity benefits from systemisation.	PARTIAL	MET
Design Principle 4: Interface — High Technical - The ScTMA airspace design will provide a compatible and optimised interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network.	MET	MET
Design Principle 5: Economic — Medium Economic - The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route. (Note: This includes track mileage / fuel burn / route charges)	PARTIAL	MET
Design Principle 6: Environmental — Medium Environmental - The proposed ScTMA airspace will facilitate the reduction of CO2 emissions along the entire route.	PARTIAL	MET
Design Principle 7: Environmental — Low Environmental - Minimise environmental impact to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsors ACP).	MET	MET
Design Principle 8: MoD — Medium Operational - The ScTMA airspace should be compatible with the requirements of the MoD.	MET	PARTIAL
Design Principle 9: GA — Medium Operational - The impacts on GA and other civilian airspace users due to ScTMA should be minimised. (Note: This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures.)	MET	PARTIAL
Design Principle 10: CAS — Medium Technical -The classification and volume of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users. (Note: This may include releasing CAS as appropriate.)	MET	PARTIAL
Design Principle 11: PBN — High Technical - The route network linking airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. (Note: Where appropriate, the use of RNP should be considered if the fleet mix can support it.)	MET	MET
Design Principle 12: AMS — High Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. (Note: The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable - the need to maximise the utilisation of existing runway capacity)	PARTIAL	MET
Design Principle 13: CCO/CCD — Medium The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft.	PARTIAL	MET

Progression criteria: Options having any High Design Principle which are Not Met (red) or 2 or more Med Design Principle Not Met or greater than 5 Design Principles partially met have been rejected.

Next Steps

Option 1 will be formally appraised under the Stage 2, Step 2B Options Appraisal (Phase 1 Initial), including Safety Assessment.

Option 0: Baseline (do nothing)	REJECT	Assessmt matrix ref
This option represents the existing airspace design, i.e. the "do nothing" option.		
Design Principle 1: Safety — High Safety - The airspace will maintain or enhance current levels of safety The exsiting airspace is demonstrably safe. This option represents the baseline for safety against which other options will be assessed.	MET	no significant safety issues identified
Design Principle 2: Resilience — High Operational - The proposed airspace will maintain or enhance operational resilience of the ATC network. Resilience maintained but not enhanced. No improvement from today's operation.	PARTIAL	No change
Design principle 3: Capacity — High Operational - The proposed airspace design will yield the greatest capacity benefits from systemisation. Existing airway is likely to support the forecast traffic growth and current orientation of traffic reduces conflictions.	PARTIAL	Design option supports the forecast traffic loading but no capacity benefit
Design principle 4: Interface — High Technical - The ScTMA airspace design will provide a compatible and optimised interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network. No Change - no impact.	MET	Minimal or no changes required for compatibility with lower level airspace
Design principle 5: Economic — Medium Economic - The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route. (Note: This includes track mileage / fuel burn / route charges) No Change - no impact.	PARTIAL	Economic performance as per today
Design principle 6: Environmental — Medium Environmental - The proposed ScTMA airspace will facilitate the reduction of CO2 emissions along the entire route. No Change - no impact.	PARTIAL	CO2 emissions as per today
Design principle 7: Environmental — Low Environmental - Minimise environmental impact to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsors ACP). No Change - no impact.	MET	No change in noise impacts below 7000ft
Design principle 8: MoD — Medium Operational - The ScTMA airspace should be compatible with the requirements of the MoD. No Change - no impact.	MET	No impact or positive impact
Design principle 9: GA — Medium Operational - The impacts on GA and other civilian airspace users due to ScTMA should be minimised. (Note: This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures.) No Change - no impact.	MET	No impact or positive impact
Design principle 10: CAS — Medium Technical -The classification and volume of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users. (Note: This may include releasing CAS as appropriate.) No Change - no impact.	MET	No increase (or reduction in) CAS required
Design principle 11: PBN — High Technical - The route network linking airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. (Note: Where appropriate, the use of RNP should be considered if the fleet mix can support it.) Existing ATS routes are RNAV5 or greater	MET	All routes needed are accommodated or the highest RNAV standards used
Design principle 12: AMS — High Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. (Note: The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable - the need to maximise the utilisation of existing runway capacity) Existing airspace partially aligns with the AMS but does not lead to sustainable growth or make efficient use of the airspace.	PARTIAL	Partially aligned with the AMS
Design principle 13: CCO/CCD — Medium The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft. No change - CCO and CCD as per todays operation	PARTIAL	CCO and CDO as per today

Conclusion:
The Do nothing Option represents no change, and will not be progressed.

ANNEX D

Option 1: Systemised routes	ACCEPT & PROGRESS	Assessmt matrix ref
Extension of the existing P600/P20 systemised route structure from GOTNA/ NELBO to the ScTMA central element.		
Design Principle 1: Safety — High Safety - The airspace will maintain or enhance current levels of safety No safety issues have been identified with this option.	MET	no significant safety issues identified
Design Principle 2: Resilience — High Operational - The proposed airspace will maintain or enhance operational resilience of the ATC network. Option 1 improves disruption recovery by providing additional systemised departure and arrival routes.	MET	Better than Current
Design principle 3: Capacity — High Operational - The proposed airspace design will yield the greatest capacity benefits from systemisation. Option 1 improves disruption recovery by providing additional systemised departure and arrival routes and reduces controller workload.	MET	Design option decreases ATCO workload
Design principle 4: Interface — High Technical - The ScTMA airspace design will provide a compatible and optimised interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network. Option 1 provides connectivity compatable with the surrounding airspace.	MET	Minimal or no changes required for compatibility with lower level airspace
Design principle 5: Economic — Medium Economic - The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route. (Note: This includes track mileage / fuel burn / route charges) Option 1 deconflicts arrival and departure routes resultng in less vectoring and provides an improvement in arrival and departure profiles. This will lead to a reduction in fuel burn.	MET	Economic performance increased
Design principle 6: Environmental — Medium Environmental - The proposed ScTMA airspace will facilitate the reduction of CO2 emissions along the entire route. Option 1 deconflicts arrival and departure routes resultng in less vectoring and provides an improvement in arrival and departure profiles. This will lead to a reduction in CO_2 emissions.	MET	CO2 emissions reduced
Design principle 7: Environmental — Low Environmental - Minimise environmental impact to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsors ACP). No change - no impact.	MET	No change in noise impacts below 7000ft
Design principle 8: MoD — Medium Operational - The ScTMA airspace should be compatible with the requirements of the MoD. Option 1 may require the airway to be widened to accommodate a systemised route structure. This may have a minor impact on MoD operations.	PARTIAL	Minor impact and not safety critical
Design principle 9: GA — Medium Operational - The impacts on GA and other civilian airspace users due to ScTMA should be minimised. (Note: This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures.) Option 1 may require the airway to be widened to accommodate a systemised route structure. This will be contained above FL70 but may impact GA operations.	PARTIAL	Minor impact and not safety critical
Design principle 10: CAS — Medium Technical -The classification and volume of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users. (Note: This may include releasing CAS as appropriate.) Option 1 may require the airway to be widened to accommodate a systemised route structure.	PARTIAL	Small increase in CAS volume required
Design principle 11: PBN — High Technical - The route network linking airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. (Note: Where appropriate, the use of RNP should be considered if the fleet mix can support it.) Any additional routes will be designed to an appropriate RNAV standard.	MET	All routes are accommodated howev er an increase in airspace volume is required due to lower
Design principle 12: AMS — High Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. (Note: The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable - the need to maximise the utilisation of existing runway capacity) This option does align with the AMS	MET	Aligned with the AMS
Design principle 13: CCO/CCD — Medium The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft. This option does enables improved CCO or CDO	MET	Positive impact on CCO and CDO

Conclusion:
The introduction of a systemised airspace structure in the South-Western element offers an increase in safety as well as providing benefits in capacity, resilience, economic and environmental benefit.
However, the cost of this benefit is the potential requirement to widen the airway to facilitate the introduction of these routes, potentially impacting the MoD and GA.
This option is considered a promising candidate and has been **Progressed** to the next Stage.

Northern Element Conclusion and Shortlist

The design principle evaluation of each design option presented on the previous pages and are summarised in the table below.

Design / Option Name:		Option 0: Baseline (do nothing)	Option 1: Bi-directional route structure and review bases	Option 2: Systemised route structure	Option 3: Systemised route structure and review bases
Accept / Reject		REJECT	ACCEPT & PROGRE	REJECT	REJECT
Design Principle 1: Safety Safety - The airspace will maintain or enhance current levels of safety	High	MET	MET	MET	MET
Design Principle 2: Resilience Operational - The proposed airspace will maintain or enhance operational resilience of the ATC network.	High	PARTIAL	MET	PARTIAL	MET
Design Principle 3: Capacity Operational - The proposed airspace design will yield the greatest capacity benefits from systemisation.	High	PARTIAL	PARTIAL	PARTIAL	PARTIAL
Design Principle 4: Interface Technical - The ScTMA airspace design will provide a compatible and optimised interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network.	High	MET	MET	MET	MET
Design Principle 5: Economic Economic - The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route. (Note: This includes track mileage / fuel burn / route charges)	Medium	PARTIAL	PARTIAL	NOT	NOT
Design Principle 6: Environmental Environmental - The proposed ScTMA airspace will facilitate the reduction of CO2 emissions along the entire route.	Medium	PARTIAL	PARTIAL	NOT	NOT
Design Principle 7: Environmental Environmental - Minimise environmental impact to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsors ACP).	Low	MET	MET	MET	MET
Design Principle 8: MoD Operational - The ScTMA airspace should be compatible with the requirements of the MoD.	Medium	MET	MET	PARTIAL	PARTIAL
Design Principle 9: GA Operational - The impacts on GA and other civilian airspace users due to ScTMA should be minimised. (Note: This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures.)	Medium	MET	MET	PARTIAL	PARTIAL
Design Principle 10: CAS Technical -The classification and volume of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users. (Note: This may include releasing CAS as appropriate.)	Medium	MET	MET	PARTIAL	PARTIAL
Design Principle 11: PBN Technical - The route network linking airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. (Note: Where appropriate, the use of RNP should be considered if the fleet mix can support it.)	High	MET	MET	MET	MET
Design Principle 12: AMS Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. (Note: The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable - the need to maximise the utilisation of existing runway capacity)	High	MET	MET	MET	MET
Design Principle 13: CCO/CCD The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft.	Medium	PARTIAL	PARTIAL	PARTIAL	PARTIAL

Progression criteria: Options having any High Design Principle which are Not Met (red) or 2 or more Med Design Principle Not Met or greater than 5 Design Principles partially met have been rejected.

Next Steps

Option 1 will be formally appraised under the Stage 2, Step 2B Options Appraisal (Phase 1 Initial), including Safety Assessment.

Option 0: Baseline (do nothing)	REJECT	Assessmt matrix ref
This option represents the existing airspace design, i.e. the "do nothing" option.		
Design Principle 1: Safety — High Safety - The airspace will maintain or enhance current levels of safety The exsiting airspace is demonstrably safe. This option represents the baseline for safety against which other options will be assessed.	MET	no significant safety issues identified
Design Principle 2: Resilience — High Operational - The proposed airspace will maintain or enhance operational resilience of the ATC network. Resilience maintained but not enhanced. No improvement from today's operation.	PARTIAL	No change
Design principle 3: Capacity — High Operational - The proposed airspace design will yield the greatest capacity benefits from systemisation. The Northern element airspace has low usage and can support the forecast growth.	PARTIAL	Design option supports the forecast traffic loading but no capacity benefit
Design principle 4: Interface — High Technical - The ScTMA airspace design will provide a compatible and optimised interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network. No Change - no impact.	MET	Minimal or no changes required for compatibility with ATS Route Network
Design principle 5: Economic — Medium Economic - The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route. (Note: This includes track mileage / fuel burn / route charges) No Change - no impact.	PARTIAL	Economic performance as per today
Design principle 6: Environmental — Medium Environmental - The proposed ScTMA airspace will facilitate the reduction of CO2 emissions along the entire route. No Change - no impact.	PARTIAL	CO2 emissions as per today
Design principle 7: Environmental — Low Environmental - Minimise environmental impact to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsors ACP). No Change - no impact.	MET	No change in noise impacts below 7000ft
Design principle 8: MoD — Medium Operational - The ScTMA airspace should be compatible with the requirements of the MoD. No Change - no impact.	MET	No impact or positive impact
Design principle 9: GA — Medium Operational - The impacts on GA and other civilian airspace users due to ScTMA should be minimised. (Note: This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures.) No Change - no impact.	MET	No impact or positive impact
Design principle 10: CAS — Medium Technical -The classification and volume of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users. (Note: This may include releasing CAS as appropriate.) No Change - no impact.	MET	No increase (or reduction in) CAS required
Design principle 11: PBN — High Technical - The route network linking airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. (Note: Where appropriate, the use of RNP should be considered if the fleet mix can support it.) Existing ATS routes are RNAV5 or greater	MET	All routes needed are accommodated or the highest RNAV standards used
Design principle 12: AMS — High Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. (Note: The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable - the need to maximise the utilisation of existing runway capacity) Existing Airspace is aligned with the AMS	MET	Aligned with the AMS
Design principle 13: CCO/CCD — Medium The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft. No change - CCO and CCD as per todays operation	PARTIAL	CCO and CDO as per today

Conclusion:
The Do nothing Option represents no change, and will not be progressed.

Option 1: Bi-directional route structure and review bases		ACCEPT & PROGRESS	Assessmt matrix ref
Maintain the existing route structure but review the base of CAS. CAS base will be amended as necessary to facilitate optimised arrival and departure profiles to/from the ScTMA Airfields.			
Design Principle 1: Safety Safety - The airspace will maintain or enhance current levels of safety No safety issues have been identified with this option.	High	MET	no significant safety issues identified
Design Principle 2: Resilience Operational - The proposed airspace will maintain or enhance operational resilience of the ATC network. Reviewing the airspace within this element will ensure all existing procedures remain within CAS.	High	MET	Better than Current
Design principle 3: Capacity Operational - The proposed airspace design will yield the greatest capacity benefits from systemisation. The Northern element airspace has low usage and can support the forecast growth.	High	PARTIAL	Design option supports the forecast traffic loading but no capacity benefit
Design principle 4: Interface Technical - The ScTMA airspace design will provide a compatible and optimised interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network. Option 1 provides connectivity compatable with the surrounding airspace.	High	MET	Minimal or no changes required for compatibility with ATS Route Network
Design principle 5: Economic Economic - The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route. (Note: This includes track mileage / fuel burn / route charges) Option 1 does not offer an economic benefit	Medium	PARTIAL	Economic performance as per today
Design principle 6: Environmental Environmental - The proposed ScTMA airspace will facilitate the reduction of CO2 emissions along the entire route. Option 1 does not offer an environmental benefit	Medium	PARTIAL	CO2 emissions as per today
Design principle 7: Environmental Environmental - Minimise environmental impact to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsors ACP). No change - no impact.	Low	MET	No change in noise impacts below 7000ft
Design principle 8: MoD Operational - The ScTMA airspace should be compatible with the requirements of the MoD. This change is not anticiated to impact MoD operations. However MoD will be engaged on any changes	Medium	MET	No impact or positive impact
Design principle 9: GA Operational - The impacts on GA and other civilian airspace users due to ScTMA should be minimised. (Note: This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures.) This change is anticiated to reqire a net reduction in airspace. Therefore GA impact will be positive	Medium	MET	No impact or positive impact
Design principle 10: CAS Technical -The classification and volume of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users. (Note: This may include releasing CAS as appropriate.) This change is anticiated to reqire a net reduction in airspace.	Medium	MET	No increase (or reduction in) CAS required
Design principle 11: PBN Technical - The route network linking airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. (Note: Where appropriate, the use of RNP should be considered if the fleet mix can support it.) Existing routes are an appropriate RNAV standard.	High	MET	All routes needed are accommodated or the highest RNAV standards used
Design principle 12: AMS Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. (Note: The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable - the need to maximise the utilisation of existing runway capacity) This option is aligned with the AMS	High	MET	Aligned with the AMS
Design principle 13: CCO/CCD The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft. No change - CCO and CCD as per todays operation	Medium	PARTIAL	CCO and CDO as per today

Conclusion:

This option maintains the existing bidirectional route structure and reviews the base of CAS along these airways. Forecast traffic demands on this airspace suggest that there is no benefit to introducing a systemised airspace structure within this element. SME input has indicated there are no benefits to CDO by lowering airspace although there is a potential to improve safety, capacity and resilience by reducing controller workload. The release of superfluous CAS enabled by this option should result in a net reduction in CAS volume.
This option is considered a promising candidate and has been **Progressed** to the next Stage.

Option 2: Systemised route structure		REJECT	Assessmt matrix ref
Introduce a systemised route structure.			
Design Principle 1: Safety Safety - The airspace will maintain or enhance current levels of safety No safety issues have been identified with this option.	High	MET	no significant safety issues identified
Design Principle 2: Resilience Operational - The proposed airspace will maintain or enhance operational resilience of the ATC network. Resilience maintained but not enhanced. No improvement from today's operation.	High	PARTIAL	No Change
Design principle 3: Capacity Operational - The proposed airspace design will yield the greatest capacity benefits from systemisation. Systemisation would offer a theoretical improvement in capacity. However, the utilisation of these airways means that this increase will not be	High	PARTIAL	Design option supports the forecast traffic loading but no capacity benefit
Design principle 4: Interface Technical - The ScTMA airspace design will provide a compatible and optimised interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network. Option 2 provides connectivity compatable with the surrounding airspace.	High	MET	Minimal or no changes required for compatibility with ATS Route Network
Design principle 5: Economic Economic - The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route. (Note: This includes track mileage / fuel burn / route charges) Systemisation increases planned track miilage as aircraft will diverge then converge to rejoin a bidirectional airway resultiing in an increase in fuel	Medium	NOT	Economic performance reduced
Design principle 6: Environmental Environmental - The proposed ScTMA airspace will facilitate the reduction of CO2 emissions along the entire route. Increased track milage as a result of systemisation will lead to an increase in CO_2 emissions	Medium	NOT	CO2 emissions increased
Design principle 7: Environmental Environmental - Minimise environmental impact to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsors ACP). No change - no impact.	Low	MET	No change in noise impacts below 7000ft
Design principle 8: MoD Operational - The ScTMA airspace should be compatible with the requirements of the MoD. Option 2 may require the airway to be widened to accommodate a systemised route structure. This may have a minor impact on MoD operations.	Medium	PARTIAL	Minor impact and not safety critical
Design principle 9: GA Operational - The impacts on GA and other civilian airspace users due to ScTMA should be minimised. (Note: This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures.) Option 3 may require the airway to be widened to accommodate a systemised route structure. This may have a minor impact on GA operations.	Medium	PARTIAL	Minor impact and not safety critical
Design principle 10: CAS Technical -The classification and volume of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users. (Note: This may include releasing CAS as appropriate.) Option 2 may require the airway to be widened to accommodate a systemised route structure.	Medium	PARTIAL	Small increase in CAS volume required
Design principle 11: PBN Technical - The route network linking airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. (Note: Where appropriate, the use of RNP should be considered if the fleet mix can support it.) Any additional routes will be designed to an appropriate RNAV standard.	High	MET	All routes are accommodated however an increase in airspace volume is required due to lower
Design principle 12: AMS Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. (Note: The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable - the need to maximise the utilisation of existing runway capacity) This option is aligned with the AMS	High	MET	Aligned with the AMS
Design principle 13: CCO/CCD The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft. No change - CCO and CCD as per todays operation	Medium	PARTIAL	CCO and CDO as per today

Conclusion:
This option introduces a systemised route structure. Forecast traffic demands on this airspace suggest that this offers limited benefit. A systemised airspace will increase track mileage and may require additional CAS impact MoD and GA operations.
2DP's (0 high) were not met and hence this option is Rejected.

Option 3: Systemised route structure and review bases	REJECT	Assessmt matrix ref
Introduce a systemised route structure and review the base of CAS. CAS base will be amended as necessary to facilitate optimised arrival and departure profiles to/from the ScTMA		
Design Principle 1: Safety High Safety - The airspace will maintain or enhance current levels of safety No safety issues have been identified with this option.	MET	no significant safety issues identified
Design Principle 2: Resilience High Operational - The proposed airspace will maintain or enhance operational resilience of the ATC network. Reviewing the airspace within this element will ensure all existing procedures remain within CAS.	MET	Better than Current
Design principle 3: Capacity High Operational - The proposed airspace design will yield the greatest capacity benefits from systemisation. Systemisation would offer a theoretical improvement in capacity. However, the utilisation of these airways means that this increase will not be	PARTIAL	Design option supports the forecast traffic loading but no capacity benefit
Design principle 4: Interface High Technical - The ScTMA airspace design will provide a compatible and optimised interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network. Option 3 provides connectivity compatable with the surrounding airspace.	MET	Minimal or no changes required for compatibility with ATS Route Network
Design principle 5: Economic Medium Economic - The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route. (Note: This includes track mileage / fuel burn / route charges) Systemisation increases planned track miilage as aircraft will diverge then converge to rejoin a bidirectional airway resultiing in an increase in fuel	NOT	Economic performance reduced
Design principle 6: Environmental Medium Environmental - The proposed ScTMA airspace will facilitate the reduction of CO2 emissions along the entire route. Increased track milage as a result of systemisation will lead to an increase in CO_2 emissions	NOT	CO2 emissions increased
Design principle 7: Environmental Low Environmental - Minimise environmental impact to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsors ACP). No change - no impact.	MET	No change in noise impacts below 7000ft
Design principle 8: MoD Medium Operational - The ScTMA airspace should be compatible with the requirements of the MoD. Option 2 may require the airway to be widened to accommodate a systemised route structure. This may have a minor impact on MoD operations.	PARTIAL	Minor impact and not safety critical
Design principle 9: GA Medium Operational - The impacts on GA and other civilian airspace users due to ScTMA should be minimised. (Note: This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures.) Option 3 may require the airway to be widened to accommodate a systemised route structure. This may have a minor impact on GA operations.	PARTIAL	Minor impact and not safety critical
Design principle 10: CAS Medium Technical -The classification and volume of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users. (Note: This may include releasing CAS as appropriate.) Option 2 may require the airway to be widened to accommodate a systemised route structure. A review of base's may release controlled airspace volume but this is unlikely to offset the CAS required to systemise the route.	PARTIAL	Small increase in CAS volume required
Design principle 11: PBN High Technical - The route network linking airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. (Note: Where appropriate, the use of RNP should be considered if the fleet mix can support it.) Any additional routes will be designed to an appropriate RNAV standard.	MET	All routes are accommodated however an increase in airspace volume is required due to lower
Design principle 12: AMS High Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. (Note: The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable - the need to maximise the utilisation of existing runway capacity) This option is aligned with the AMS	MET	Aligned with the AMS
Design principle 13: CCO/CCD Medium The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft. No change - CCO and CCD as per todays operation	PARTIAL	CCO and CDO as per today

Conclusion:
4This option introduces a systemised route structure. Forecast traffic demands on this airspace suggest that this offers limited benefit. A systemised airspace will increase track mileage and may require additional CAS impact MoD and GA operations. A review of CAS base's may enable improved CDO operations or release superfluous CAS.
2DP's (0 High) were not met and hence this option is Rejected.

Central Element Conclusion and Shortlist

The design principle evaluation of each design option presented on the previous pages and are summarised in the table below.

Design / Option Name:	Option 0: Baseline (do nothing)	Option 1: Provide ATS route connectivity to/between surrounding elements within existing CAS
Accept / Reject .	REJECT	ACCEPT & PROGRE
Design Principle 1: Safety — High Safety - The airspace will maintain or enhance current levels of safety	MET	MET
Design Principle 2: Resilience — High Operational - The proposed airspace will maintain or enhance operational resilience of the ATC network.	PARTIAL	MET
Design Principle 3: Capacity — High Operational - The proposed airspace design will yield the greatest capacity benefits from systemisation.	PARTIAL	MET
Design Principle 4: Interface — High Technical - The ScTMA airspace design will provide a compatible and optimised interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network.	MET	MET
Design Principle 5: Economic — Medium Economic - The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route. (Note: This includes track mileage / fuel burn / route charges)	PARTIAL	MET
Design Principle 6: Environmental — Medium Environmental - The proposed ScTMA airspace will facilitate the reduction of CO2 emissions along the entire route.	PARTIAL	MET
Design Principle 7: Environmental — Low Environmental - Minimise environmental impact to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsors ACP).	MET	MET
Design Principle 8: MoD — Medium Operational - The ScTMA airspace should be compatible with the requirements of the MoD.	MET	MET
Design Principle 9: GA — Medium Operational - The impacts on GA and other civilian airspace users due to ScTMA should be minimised. (Note: This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures.)	MET	MET
Design Principle 10: CAS — Medium Technical -The classification and volume of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users. (Note: This may include releasing CAS as appropriate.)	MET	MET
Design Principle 11: PBN — High Technical - The route network linking airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. (Note: Where appropriate, the use of RNP should be considered if the fleet mix can support it.)	MET	MET
Design Principle 12: AMS — High Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. (Note: The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable - the need to maximise the utilisation of existing runway capacity)	PARTIAL	MET
Design Principle 13: CCO/CCD — Medium The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft.	PARTIAL	PARTIAL

Progression criteria: Options having any High Design Principle which are Not Met (red) or 2 or more Med Design Principle Not Met or greater than 5 Design Principles partially met have been rejected.

Next Steps

Options 1 will be formally appraised under the Stage 2, Step 2B Options Appraisal (Phase 1 Initial), including Safety Assessment.

Option 0: Baseline (do nothing)	REJECT	Assessmt matrix ref
This option represents the existing airspace design, i.e. the "do nothing" option.		
Design Principle 1: Safety — High Safety - The airspace will maintain or enhance current levels of safety The exsiting airspace is demonstrably safe. This option represents the baseline for safety against which other options will be assessed.	MET	no significant safety issues identified
Design Principle 2: Resilience — High Operational - The proposed airspace will maintain or enhance operational resilience of the ATC network. Resilience maintained but not enhanced. No improvement from today's operation.	PARTIAL	No change
Design principle 3: Capacity — High Operational - The proposed airspace design will yield the greatest capacity benefits from systemisation. Existing airway is likely to support the forecast traffic growth.	PARTIAL	Design option supports the forecast traffic loading but no capacity benefit
Design principle 4: Interface — High Technical - The ScTMA airspace design will provide a compatible and optimised interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network. Existing airways align with the extant structure and would require minimal changes to align with proposed element changes.	MET	Minimal or no changes required for compatibility with ATS Route Network
Design principle 5: Economic — Medium Economic - The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route. (Note: This includes track mileage / fuel burn / route charges) No Change - no impact.	PARTIAL	Economic performance as per today
Design principle 6: Environmental — Medium Environmental - The proposed ScTMA airspace will facilitate the reduction of CO2 emissions along the entire route. No Change - no impact.	PARTIAL	CO2 emissions as per today
Design principle 7: Environmental — Low Environmental - Minimise environmental impact to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsors ACP). No change - no impact.	MET	No change in noise impacts below 7000ft
Design principle 8: MoD — Medium Operational - The ScTMA airspace should be compatible with the requirements of the MoD. No change - no impact.	MET	No impact or positive impact
Design principle 9: GA — Medium Operational - The impacts on GA and other civilian airspace users due to ScTMA should be minimised. (Note: This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures.) No Change - no impact.	MET	No impact or positive impact
Design principle 10: CAS — Medium Technical -The classification and volume of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users. (Note: This may include releasing CAS as appropriate.) No Change in CAS volume - no impact.	MET	No increase (or reduction in) CAS required
Design principle 11: PBN — High Technical - The route network linking airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. (Note: Where appropriate, the use of RNP should be considered if the fleet mix can support it.) Existing ATS routes are RNAV5 or greater	MET	All routes needed are accommodated or the highest RNAV standards used
Design principle 12: AMS — High Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. (Note: The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable - the need to maximise the utilisation of existing runway capacity) Existing airspace partially aligns with the AMS but does not lead to sustainable growth or make efficient use of the airspace.	PARTIAL	Partially aligned with the AMS
Design principle 13: CCO/CCD — Medium The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft. This opton has not impact on CCO/CDO	PARTIAL	CCO and CDO as per today

Conclusion:
The Do nothing Option represents no change, and will not be progressed.

Option 1: Provide ATS route connectivity to/between surrounding elements within existing CAS	ACCEPT & PROGRESS	Assessmt matrix ref
Introduction of ATS routes connecting ATS routes arriving and departing the ScTMA contained within existing CAS.		
Design Principle 1: Safety — High Safety - The airspace will maintain or enhance current levels of safety No safety issues have been identified with this option.	MET	no significant safety issues identified
Design Principle 2: Resilience — High Operational - The proposed airspace will maintain or enhance operational resilience of the ATC network. Improved connectivity to the surrounding elements will enhance the airspace resilience	MET	Better than Current
Design principle 3: Capacity — High Operational - The proposed airspace design will yield the greatest capacity benefits from systemisation. Improved connectivity between the surrounding elements will reduce controller workload by reducing conflictions and enhance the airspace	MET	Design option decreases ATCO workload
Design principle 4: Interface — High Technical - The ScTMA airspace design will provide a compatible and optimised interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network. Option 1 provides connectivity compatable with the surrounding airspace.	MET	Minimal or no changes required for compatibility with ATS Route Network
Design principle 5: Economic — Medium Economic - The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route. (Note: This includes track mileage / fuel burn / route charges) New routes will be designed tusing PBN to offer more direct connectivity between the elements reducing track mileage and fuel burn.	MET	Economic performance increased
Design principle 6: Environmental — Medium Environmental - The proposed ScTMA airspace will facilitate the reduction of CO2 emissions along the entire route. New routes will be designed tusing PBN to offer more direct connectivity between the elements reducing track mileage and CO_2 emissions.	MET	CO2 emissions reduced
Design principle 7: Environmental — Low Environmental - Minimise environmental impact to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsors ACP). No change - no impact.	MET	No change in noise impacts below 7000ft
Design principle 8: MoD — Medium Operational - The ScTMA airspace should be compatible with the requirements of the MoD. No Change to existing CAS, therefore MoD access will be as per todays operation	MET	No impact or positive impact
Design principle 9: GA — Medium Operational - The impacts on GA and other civilian airspace users due to ScTMA should be minimised. (Note: This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures.) No Change to existing CAS, therefore GA access will be as per todays operation	MET	No impact or positive impact
Design principle 10: CAS — Medium Technical -The classification and volume of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users. (Note: This may include releasing CAS as appropriate.) This option will be contained within the confines of existing CAS	MET	No increase (or reduction in) CAS required
Design principle 11: PBN — High Technical - The route network linking airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. (Note: Where appropriate, the use of RNP should be considered if the fleet mix can support it.) All new routes will be an appropriate RNAV standard.	MET	All routes are accommodated howev er an increase in airspace volume is required due to lower
Design principle 12: AMS — High Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. (Note: The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable - the need to maximise the utilisation of existing runway capacity) This option is aligned with the AMS	MET	Aligned with the AMS
Design principle 13: CCO/CCD — Medium The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft. This element is for overflight provision and therefore has no impact on CDO or CCO	PARTIAL	CCO and CDO as per today

Conclusion:
The introduction of ATS routes providing connectivity between the surrounding elements provides an increase in resilience and capacity whilst reducing controller workload, fuel burn and CO_2 emissions. This option will be contained within existing CAS and therefore will not impact GA or MoD operations.
This option is considered a promising candidate and has been **Progressed** to the next Stage.

Departure Connectivity Conclusion and Shortlist

The design principle evaluation of each design option presented on the previous pages and are summarised in the table below.

Design / Option Name:		Option 0: Baseline (do nothing)	Option 1: Provide departure connectivity from airport SID end points to adjacent elements via ATS routes within existing CAS	Option 2: Provide departure connectivity from airport SID end points to adjacent elements via ATS routes requiring new CAS
Accept / Reject .		REJECT	ACCEPT & PROGRE	ACCEPT & PROGRES S
Design Principle 1: Safety Safety - The airspace will maintain or enhance current levels of safety	High	MET	MET	MET
Design Principle 2: Resilience Operational - The proposed airspace will maintain or enhance operational resilience of the ATC network.	High	PARTIAL	MET	MET
Design Principle 3: Capacity Operational - The proposed airspace design will yield the greatest capacity benefits from systemisation.	High	PARTIAL	MET	MET
Design Principle 4: Interface Technical - The ScTMA airspace design will provide a compatible and optimised interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network.	High	MET	MET	MET
Design Principle 5: Economic Economic - The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route. (Note: This includes track mileage / fuel burn / route charges)	Medium	PARTIAL	MET	MET
Design Principle 6: Environmental Environmental - The proposed ScTMA airspace will facilitate the reduction of CO2 emissions along the entire route.	Medium	PARTIAL	MET	MET
Design Principle 7: Environmental Environmental - Minimise environmental impact to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsors ACP).	Low	MET	MET	MET
Design Principle 8: MoD Operational - The ScTMA airspace should be compatible with the requirements of the MoD.	Medium	MET	MET	PARTIAL
Design Principle 9: GA Operational - The impacts on GA and other civilian airspace users due to ScTMA should be minimised. (Note: This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures.)	Medium	MET	MET	PARTIAL
Design Principle 10: CAS Technical -The classification and volume of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users. (Note: This may include releasing CAS as appropriate.)	Medium	MET	MET	PARTIAL
Design Principle 11: PBN Technical - The route network linking airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. (Note: Where appropriate, the use of RNP should be considered if the fleet mix can support it.)	High	MET	MET	MET
Design Principle 12: AMS Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. (Note: The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable - the need to maximise the utilisation of existing runway capacity)	High	MET	MET	MET
Design Principle 13: CCO/CCD The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft.	Medium	PARTIAL	MET	MET

Progression criteria: Options having any High Design Principle which are Not Met (red) or 2 or more Med Design Principle Not Met or greater than 5 Design Principles partially met have been rejected.

Next Steps

Options 1 & 2 will be formally appraised under the Stage 2, Step 2B Options Appraisal (Phase 1 Initial), including Safety Assessment.

Option 0: Baseline (do nothing)	REJECT	Assessmt matrix ref
This option represents the existing airspace design, i.e. the "do nothing" option.		
Design Principle 1: Safety — High Safety - The airspace will maintain or enhance current levels of safety The exsiting airspace is demonstrably safe. This option represents the baseline for safety against which other options will be assessed.	MET	no significant safety issues identified
Design Principle 2: Resilience — High Operational - The proposed airspace will maintain or enhance operational resilience of the ATC network. Resilience maintained but not enhanced. No improvement from today's operation.	PARTIAL	No change
Design principle 3: Capacity — High Operational - The proposed airspace design will yield the greatest capacity benefits from systemisation. Existing departure routes are likely to support the forecast traffic growth and current orientation of traffic reduces conflictions.	PARTIAL	No change or minor increase to ATCO workload
Design principle 4: Interface — High Technical - The ScTMA airspace design will provide a compatible and optimised interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network. The baseline do nothing option provides a compatible interface between the airports departure routes and the ATS route network	MET	Minimal or no changes required for compatibility with lower level airspace
Design principle 5: Economic — Medium Economic - The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route. (Note: This includes track mileage / fuel burn / route charges) No Change - no impact.	PARTIAL	Economic performance as per today
Design principle 6: Environmental — Medium Environmental - The proposed ScTMA airspace will facilitate the reduction of CO2 emissions along the entire route. No Change - no impact.	PARTIAL	CO2 emissions as per today
Design principle 7: Environmental — Low Environmental - Minimise environmental impact to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsors ACP). No Change - no impact.	MET	No change in noise impacts below 7000ft
Design principle 8: MoD — Medium Operational - The ScTMA airspace should be compatible with the requirements of the MoD. No Change - no impact.	MET	No impact or positive impact
Design principle 9: GA — Medium Operational - The impacts on GA and other civilian airspace users due to ScTMA should be minimised. (Note: This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures.) No Change - no impact.	MET	No impact or positive impact
Design principle 10: CAS — Medium Technical -The classification and volume of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users. (Note: This may include releasing CAS as appropriate.) No Change - no impact.	MET	No increase (or reduction in) CAS required
Design principle 11: PBN — High Technical - The route network linking airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. (Note: Where appropriate, the use of RNP should be considered if the fleet mix can support it.) Existing ATS routes are RNAV5 or greater	MET	All routes needed are accommodated or the highest RNAV standards used
Design principle 12: AMS — High Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. (Note: The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable - the need to maximise the utilisation of existing runway capacity) The do nothing option is compliant with the AMS	MET	Aligned with the AMS
Design principle 13: CCO/CCD — Medium The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft. No change - CCO and CCD as per todays operation	PARTIAL	CCO and CDO as per today

Conclusion:
The Do nothing Option represents no change, and will not be progressed.

Option 1: Provide departure connectivity from airport SID end points to adjacent elements via ATS routes within existing CAS	ACCEPT & PROGRESS	Assessmt matrix ref
Provision of link routes connecting airport SID end points with the ATS network.		
Design Principle 1: Safety — High Safety - The airspace will maintain or enhance current levels of safety No safety issues have been identified with this option.	MET	no significant safety issues identified
Design Principle 2: Resilience — High Operational - The proposed airspace will maintain or enhance operational resilience of the ATC network. Improved connectivity for departing aircraft will lead to improved resilience	MET	Better than Current
Design principle 3: Capacity — High Operational - The proposed airspace design will yield the greatest capacity benefits from systemisation. Improved connectivity for departing aircraft should lead to a reduction in workload and improved capacity	MET	Design option decreases ATCO workload
Design principle 4: Interface — High Technical - The ScTMA airspace design will provide a compatible and optimised interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network. The provision of connectivity from the SIDs to the ATS network will be compatatible	MET	Minimal or no changes required for compatibility with lower level airspace
Design principle 5: Economic — Medium Economic - The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route. (Note: This includes track mileage / fuel burn / route charges) Link routes will provide improved connectivity between SID end points and the ATS network. A reduction in conflictions will lead improved CCO and CDO leading to a reduction in fuel.	MET	Economic performance increased
Design principle 6: Environmental — Medium Environmental - The proposed ScTMA airspace will facilitate the reduction of CO2 emissions along the entire route. Link routes will provide improved connectivity between SID end points and the ATS network. A reduction in conflictions will lead improved CCO and CDO leading to a reduction in CO_2 emissions.	MET	CO2 emissions reduced
Design principle 7: Environmental — Low Environmental - Minimise environmental impact to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsors ACP). No change - no impact.	MET	No change in noise impacts below 7000ft
Design principle 8: MoD — Medium Operational - The ScTMA airspace should be compatible with the requirements of the MoD. Change will be within existing CAS - no impact.	MET	No impact or positive impact
Design principle 9: GA — Medium Operational - The impacts on GA and other civilian airspace users due to ScTMA should be minimised. (Note: This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures.) Change will be within existing CAS - no impact.	MET	No impact or positive impact
Design principle 10: CAS — Medium Technical -The classification and volume of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users. (Note: This may include releasing CAS as appropriate.) Change will be within existing CAS - no impact.	MET	No increase (or reduction in) CAS required
Design principle 11: PBN — High Technical - The route network linking airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. (Note: Where appropriate, the use of RNP should be considered if the fleet mix can support it.) Appropriate RNAV specification is used	MET	All routes needed are accommodated or the highest RNAV standards used
Design principle 12: AMS — High Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. (Note: The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable - the need to maximise the utilisation of existing runway capacity) This option does align with the AMS	MET	Aligned with the AMS
Design principle 13: CCO/CCD — Medium The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft. This option will offer a positive improvement to CDO and CCO	MET	Positive impact on CCO and CDO

Conclusion:
This option provides connectivity between the airports SIDs and the ATS route network. However, until the SID endpoints are finalised the requirement of a link route is unknown. Link routes can be designed to remain segregated from arrival aircraft enabling improved CCO, CDO, fuel and CO2 emission benefits whilst reducing controller workload.
This option is considered a promising candidate and has been **Progressed** to the next Stage.

Option 2: Provide departure connectivity from airport SID end points to adjacent elements via ATS routes requiring new CAS	ACCEPT & PROGRESS	Assessmt matrix ref
Provision of flight-plannable DCTs ATS routes arriving and departing the ScTMA requiring additional CAS.		
Design Principle 1: Safety High Safety - The airspace will maintain or enhance current levels of safety No safety issues have been identified with this option.	MET	no significant safety issues identified
Design Principle 2: Resilience High Operational - The proposed airspace will maintain or enhance operational resilience of the ATC network. Improved connectivity for departing aircraft will lead to improved resilience	MET	Better than Current
Design principle 3: Capacity High Operational - The proposed airspace design will yield the greatest capacity benefits from systemisation. Improved connectivity for departing aircraft will lead to a reduction in workload and improved capacity	MET	Design option decreases ATCO workload
Design principle 4: Interface High Technical - The ScTMA airspace design will provide a compatible and optimised interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network. The provision of connectivity from the SIDs to the ATS network will be compatatible	MET	Minimal or no changes required for compatibility with ATS Route Network
Design principle 5: Economic Medium Economic - The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route. (Note: This includes track mileage / fuel burn / route charges) Link routes will provide improved connectivity between SID end points and the ATS network. A reduction in conflictions will lead improved CCO and CDO leading to a reduction in fuel.	MET	Economic performance increased
Design principle 6: Environmental Medium Environmental - The proposed ScTMA airspace will facilitate the reduction of CO2 emissions along the entire route. Link routes will provide improved connectivity between SID end points and the ATS network. A reduction in conflictions will lead improved CCO and CDO leading to a reduction in CO_2 emissions.	MET	CO2 emissions reduced
Design principle 7: Environmental Low Environmental - Minimise environmental impact to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsors ACP). No change - no impact.	MET	No change in noise impacts below 7000ft
Design principle 8: MoD Medium Operational - The ScTMA airspace should be compatible with the requirements of the MoD. Option 2 reuires a small increase in CAS which may impact MoD operations	PARTIAL	Minor impact and not safety critical
Design principle 9: GA Medium Operational - The impacts on GA and other civilian airspace users due to ScTMA should be minimised. (Note: This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures.) Option 2 reuires a small increase in CAS which may impact GA operations	PARTIAL	Minor impact and not safety critical
Design principle 10: CAS Medium Technical -The classification and volume of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users. (Note: This may include releasing CAS as appropriate.) Option 2 requires a small increase in CAS	PARTIAL	Small increase in CAS volume required
Design principle 11: PBN High Technical - The route network linking airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. (Note: Where appropriate, the use of RNP should be considered if the fleet mix can support it.) Appropriate RNAV specification is used	MET	All routes needed are accommodated or the highest RNAV standards used
Design principle 12: AMS High Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. (Note: The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable - the need to maximise the utilisation of existing runway capacity) This option does align with the AMS	MET	Aligned with the AMS
Design principle 13: CCO/CCD Medium The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft. This option will offer a positive improvement to CDO and CCO	MET	Positive impact on CCO and CDO

Conclusion:
This option provides connectivity between the airports SIDs and the ATS route network. However, until the SID endpoints are finalised the requirement of a link route is unknown. Link routes can be designed to remain segregated from arrival aircraft enabling improved CCO,CDO, fuel and CO2 emission benefits whilst reducing controller workload. This option will require additional CAS which could impact MoD and GA operations.
This option is considered a promising candidate and has been Progressed to the next Stage.

Arrival Connectivity Element Conclusion and Shortlist

The design principle evaluation of each design option presented on the previous pages and are summarised in the table below.

Design / Option Name:		Option 0: Baseline (do nothing)	Option 1: Provide arrival connectivity from ATS route network to airport arrival structure via STARs within existing CAS	Option 2: Provide arrival connectivity from ATS route network to airport arrival structure via STARs requiring additional
Accept / Reject .		REJECT	ACCEPT & PROGRE	ACCEPT & PROGRES S
Design Principle 1: Safety Safety - The airspace will maintain or enhance current levels of safety	High	MET	MET	MET
Design Principle 2: Resilience Operational - The proposed airspace will maintain or enhance operational resilience of the ATC network.	High	PARTIAL	MET	MET
Design Principle 3: Capacity Operational - The proposed airspace design will yield the greatest capacity benefits from systemisation.	High	PARTIAL	MET	MET
Design Principle 4: Interface Technical - The ScTMA airspace design will provide a compatible and optimised interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network.	High	MET	MET	MET
Design Principle 5: Economic Economic - The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route. (Note: This includes track mileage / fuel burn / route charges)	Medium	PARTIAL	MET	MET
Design Principle 6: Environmental Environmental - The proposed ScTMA airspace will facilitate the reduction of CO2 emissions along the entire route.	Medium	PARTIAL	MET	MET
Design Principle 7: Environmental Environmental - Minimise environmental impact to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsors ACP).	Low	MET	MET	MET
Design Principle 8: MoD Operational - The ScTMA airspace should be compatible with the requirements of the MoD.	Medium	MET	MET	PARTIAL
Design Principle 9: GA Operational - The impacts on GA and other civilian airspace users due to ScTMA should be minimised. (Note: This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures.)	Medium	MET	MET	PARTIAL
Design Principle 10: CAS Technical -The classification and volume of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users. (Note: This may include releasing CAS as appropriate.)	Medium	MET	MET	PARTIAL
Design Principle 11: PBN Technical - The route network linking airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. (Note: Where appropriate, the use of RNP should be considered if the fleet mix can support it.)	High	MET	MET	MET
Design Principle 12: AMS Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. (Note: The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable - the need to maximise the utilisation of existing runway capacity)	High	MET	MET	MET
Design Principle 13: CCO/CCD The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft.	Medium	PARTIAL	MET	MET

Progression criteria: Options having any High Design Principle which are Not Met (red) or 2 or more Med Design Principle Not Met or greater than 5 Design Principles partially met have been rejected.

Next Steps

Options 1 & 2 will be formally appraised under the Stage 2, Step 2B Options Appraisal (Phase 1 Initial), including Safety Assessment.

ANNEX D

Option 0: Baseline (do nothing)		REJECT	Assessmt matrix ref
This option represents the existing airspace design, i.e. the "do nothing" option.			
Design Principle 1: Safety Safety - The airspace will maintain or enhance current levels of safety The exsiting airspace is demonstrably safe. This option represents the baseline for safety against which other options will be assessed.	High	MET	no significant safety issues identified
Design Principle 2: Resilience Operational - The proposed airspace will maintain or enhance operational resilience of the ATC network. Resilience maintained but not enhanced. No improvement from today's operation.	High	PARTIAL	No change
Design principle 3: Capacity Operational - The proposed airspace design will yield the greatest capacity benefits from systemisation. Existing arrival routes are likely to support the forecast traffic growth and current orientation of traffic reduces conflictions.	High	PARTIAL	No change or minor increase to ATCO workload
Design principle 4: Interface Technical - The ScTMA airspace design will provide a compatible and optimised interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network. The baseline do nothing option provides a compatible interface between the ATS route network and the airports holding structures	High	MET	Minimal or no changes required for compatibility with ATS Route Network
Design principle 5: Economic Economic - The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route. (Note: This includes track mileage / fuel burn / route charges) No Change - no impact.	Medium	PARTIAL	Economic performance as per today
Design principle 6: Environmental Environmental - The proposed ScTMA airspace will facilitate the reduction of CO2 emissions along the entire route. No Change - no impact.	Medium	PARTIAL	CO2 emissions as per today
Design principle 7: Environmental Environmental - Minimise environmental impact to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsors ACP). No Change - no impact.	Low	MET	No change in noise impacts below 7000ft
Design principle 8: MoD Operational - The ScTMA airspace should be compatible with the requirements of the MoD. No Change - no impact.	Medium	MET	No impact or positive impact
Design principle 9: GA Operational - The impacts on GA and other civilian airspace users due to ScTMA should be minimised. (Note: This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures.) No Change - no impact.	Medium	MET	No impact or positive impact
Design principle 10: CAS Technical -The classification and volume of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users. (Note: This may include releasing CAS as appropriate.) No Change - no impact.	Medium	MET	No increase (or reduction in) CAS required
Design principle 11: PBN Technical - The route network linking airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. (Note: Where appropriate, the use of RNP should be considered if the fleet mix can support it.) Existing STARs are RNAV5 or greater	High	MET	All routes needed are accommodated or the highest RNAV standards used
Design principle 12: AMS Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. (Note: The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable - the need to maximise the utilisation of existing runway capacity) The do nothing option is compliant with the AMS	High	MET	Aligned with the AMS
Design principle 13: CCO/CCD The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft. No change - CCO and CCD as per todays operation	Medium	PARTIAL	CCO and CDO as per today

Conclusion:
The Do nothing Option represents no change, and will not be progressed.

Option 1: Provide arrival connectivity from ATS route network to airport arrival structure via STARs within existing CAS	ACCEPT & PROGRESS	Assessmt matrix ref
Provision of link routes connecting ATS network with airport arrival structure within existing CAS.		
Design Principle 1: Safety — High Safety - The airspace will maintain or enhance current levels of safety No safety issues have been identified with this option.	MET	no significant safety issues identified
Design Principle 2: Resilience — High Operational - The proposed airspace will maintain or enhance operational resilience of the ATC network. Improved connectivity for arriving aircraft will lead to improved resilience	MET	Better than Current
Design principle 3: Capacity — High Operational - The proposed airspace design will yield the greatest capacity benefits from systemisation. Improved connectivity for arriving aircraft will lead to a reduction in workload and improved capacity	MET	Design option decreases ATCO workload
Design principle 4: Interface — High Technical - The ScTMA airspace design will provide a compatible and optimised interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network. The provision of connectivity from the ATS network to the airport holding struccture will be compatatible	MET	Minimal or no changes required for compatibility with ATS Route Network
Design principle 5: Economic — Medium Economic - The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route. (Note: This includes track mileage / fuel burn / route charges) STARs will provide improved connectivity the ATS network and the airports holding structure. A reduction in conflictions will lead improved CCO and CDO leading to a reduction in fuel burn.	MET	Economic performance increased
Design principle 6: Environmental — Medium Environmental - The proposed ScTMA airspace will facilitate the reduction of CO2 emissions along the entire route. STARs will provide improved connectivity the ATS network and the airports holding structure. A reduction in conflictions will lead improved CCO and CDO leading to a reduction in CO_2 emissions.	MET	CO2 emissions reduced
Design principle 7: Environmental — Low Environmental - Minimise environmental impact to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsors ACP). No change - no impact.	MET	No change in noise impacts below 7000ft
Design principle 8: MoD — Medium Operational - The ScTMA airspace should be compatible with the requirements of the MoD. Change will be within existing CAS - no impact.	MET	No impact or positive impact
Design principle 9: GA — Medium Operational - The impacts on GA and other civilian airspace users due to ScTMA should be minimised. (Note: This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures.) Change will be within existing CAS - no impact.	MET	No impact or positive impact
Design principle 10: CAS — Medium Technical -The classification and volume of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users. (Note: This may include releasing CAS as appropriate.) Change will be within existing CAS - no impact.	MET	No increase (or reduction in) CAS required
Design principle 11: PBN — High Technical - The route network linking airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. (Note: Where appropriate, the use of RNP should be considered if the fleet mix can support it.) Appropriate RNAV specification is used	MET	All routes are accommodated howev er an increase in airspace volume is required due to lower
Design principle 12: AMS — High Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. (Note: The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable - the need to maximise the utilisation of existing runway capacity) This option does align with the AMS	MET	Aligned with the AMS
Design principle 13: CCO/CCD — Medium The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft. This option will offer a positive improvement to CDO and CCO	MET	Positive impact on CCO and CDO

Conclusion:

This option provides connectivity between the ATS route network and the airport holding structure by the provision of STARs. However, until the STAR endpoints are finalised the potential STAR routing is unknown. STARs will be designed to remain segregated from departure aircraft enabling improved CCO, CDO, fuel and CO2 emission benefits whilst reducing controller workload.

This option is considered a promising candidate and has been **Progressed** to the next Stage.

Option 2: Provide arrival connectivity from ATS route network to airport arrival structure via STARs requiring additional CAS	ACCEPT & PROGRESS	Assessmt matrix ref
Provision of link routes connecting ATS network with airport arrival structure requiring additional existing CAS.		
Design Principle 1: Safety High Safety - The airspace will maintain or enhance current levels of safety No safety issues have been identified with this option.	MET	no significant safety issues identified
Design Principle 2: Resilience High Operational - The proposed airspace will maintain or enhance operational resilience of the ATC network. Improved connectivity for arriving aircraft will lead to improved resilience	MET	Better than Current
Design principle 3: Capacity High Operational - The proposed airspace design will yield the greatest capacity benefits from systemisation. Improved connectivity for arriving aircraft will lead to a reduction in workload and improved capacity	MET	Design option decreases ATCO workload
Design principle 4: Interface High Technical - The ScTMA airspace design will provide a compatible and optimised interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network. The provision of connectivity from the ATS network to the airport holding struccture will be compatatible	MET	Minimal or no changes required for compatibility with ATS Route Network
Design principle 5: Economic Medium Economic - The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route. (Note: This includes track mileage / fuel burn / route charges) STARs will provide improved connectivity the ATS network and the airports holding structure. A reduction in conflictions will lead improved CCO and CDO leading to a reduction in fuel burn.	MET	Economic performance increased
Design principle 6: Environmental Medium Environmental - The proposed ScTMA airspace will facilitate the reduction of CO2 emissions along the entire route. STARs will provide improved connectivity the ATS network and the airports holding structure. A reduction in conflictions will lead improved CCO and CDO leading to a reduction in CO_2 emissions.	MET	CO2 emissions reduced
Design principle 7: Environmental Low Environmental - Minimise environmental impact to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsors ACP). No change - no impact.	MET	No change in noise impacts below 7000ft
Design principle 8: MoD Medium Operational - The ScTMA airspace should be compatible with the requirements of the MoD. Option 2 reuires a small increase in CAS which may impact MoD operations	PARTIAL	Minor impact and not safety critical
Design principle 9: GA Medium Operational - The impacts on GA and other civilian airspace users due to ScTMA should be minimised. (Note: This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures.) Option 2 reuires a small increase in CAS which may impact GA operations	PARTIAL	Minor impact and not safety critical
Design principle 10: CAS Medium Technical -The classification and volume of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users. (Note: This may include releasing CAS as appropriate.) Option 2 requires a small increase in CAS	PARTIAL	Small increase in CAS volume required
Design principle 11: PBN High Technical - The route network linking airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. (Note: Where appropriate, the use of RNP should be considered if the fleet mix can support it.) Appropriate RNAV specification is used	MET	All routes needed are accommodated or the highest RNAV standards used
Design principle 12: AMS High Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. (Note: The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable - the need to maximise the utilisation of existing runway capacity) This option does align with the AMS	MET	Aligned with the AMS
Design principle 13: CCO/CCD Medium The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft. This option will offer a positive improvement to CDO and CCO	MET	Positive impact on CCO and CDO

Conclusion:

This option provides connectivity between the ATS route network and the airports holding structures without the constraint of existing CAS. By providing additional airspace for the STARS, aircraft can be redistributed within the ScTMA providing fuel capacity and resilience benefits by reducing conflictions and reducing controller workload. This option will require additional CAS which could impact MoD and GA operations.

This option is considered a promising candidate and has been **Progressed** to the next Stage.

ANNEX D

Arrival Structure Conclusion and Shortlist

The design principle evaluation of each design option presented on the previous pages and are summarised in the table below.

Design / Option Name:		Option 0: Baseline (do nothing)	Option 1: Review existing holds and introduce new radial holds where required.	Option 2: Review existing holds and introduce new lateral delay absorption structures (i.e. point merge).
	Accept / Reject	REJECT	ACCEPT & PROGRE	REJECT
Design Principle 1: Safety Safety - The airspace will maintain or enhance current levels of safety	High	MET	MET	MET
Design Principle 2: Resilience Operational - The proposed airspace will maintain or enhance operational resilience of the ATC network.	High	PARTIAL	MET	NOT
Design Principle 3: Capacity Operational - The proposed airspace design will yield the greatest capacity benefits from systemisation.	High	PARTIAL	MET	MET
Design Principle 4: Interface Technical - The ScTMA airspace design will provide a compatible and optimised interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network.	High	MET	MET	NOT
Design Principle 5: Economic Economic - The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route. (Note: This includes track mileage / fuel burn / route charges)	Medium	PARTIAL	MET	NOT
Design Principle 6: Environmental Environmental - The proposed ScTMA airspace will facilitate the reduction of CO2 emissions along the entire route.	Medium	PARTIAL	MET	NOT
Design Principle 7: Environmental Environmental - Minimise environmental impact to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsors ACP).	Low	MET	MET	PARTIAL
Design Principle 8: MoD Operational - The ScTMA airspace should be compatible with the requirements of the MoD.	Medium	MET	PARTIAL	MET
Design Principle 9: GA Operational - The impacts on GA and other civilian airspace users due to ScTMA should be minimised. (Note: This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures.)	Medium	MET	PARTIAL	MET
Design Principle 10: CAS Technical -The classification and volume of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users. (Note: This may include releasing CAS as appropriate.)	Medium	MET	PARTIAL	MET
Design Principle 11: PBN Technical - The route network linking airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. (Note: Where appropriate, the use of RNP should be considered if the fleet mix can support it.)	High	MET	MET	MET
Design Principle 12: AMS Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. (Note: The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable - the need to maximise the utilisation of existing runway capacity)	High	PARTIAL	MET	MET
Design Principle 13: CCO/CCD The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft.	Medium	PARTIAL	MET	NOT

Progression criteria: Options having any High Design Principle which are Not Met (red) or 2 or more Med Design Principle Not Met or greater than 5 Design Principles partially met have been rejected.

Next Steps

Option 1 will be formally appraised under the Stage 2, Step 2B Options Appraisal (Phase 1 Initial), including Safety Assessment.

Option 0: Baseline (do nothing)		REJECT	Assessmt matrix ref
This option represents the existing airspace design, i.e. the "do nothing" option.			
Design Principle 1: Safety Safety - The airspace will maintain or enhance current levels of safety The exsiting airspace is demonstrably safe. This option represents the baseline for safety against which other options will be assessed.	High	MET	no significant safety issues identified
Design Principle 2: Resilience Operational - The proposed airspace will maintain or enhance operational resilience of the ATC network. Resilience maintained but not enhanced. No improvement from today's operation.	High	PARTIAL	No change
Design principle 3: Capacity Operational - The proposed airspace design will yield the greatest capacity benefits from systemisation. Existing holds are likely to support the forecast traffic growth although no necessarily located in the optimal position.	High	PARTIAL	No change or minor increase to ATCO workload
Design principle 4: Interface Technical - The ScTMA airspace design will provide a compatible and optimised interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network. The baseline do nothing option provides a compatible interface between STARs and airport approach procedures	High	MET	Minimal or no changes required for compatibility with lower level airspace
Design principle 5: Economic Economic - The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route. (Note: This includes track mileage / fuel burn / route charges) No Change - no impact.	Medium	PARTIAL	Economic performance as per today
Design principle 6: Environmental Environmental - The proposed ScTMA airspace will facilitate the reduction of CO2 emissions along the entire route. No Change - no impact.	Medium	PARTIAL	CO2 emissions as per today
Design principle 7: Environmental Environmental - Minimise environmental impact to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsors ACP). No Change - no impact.	Low	MET	No change in noise impacts below 7000ft
Design principle 8: MoD Operational - The ScTMA airspace should be compatible with the requirements of the MoD. No Change - no impact.	Medium	MET	No impact or positive impact
Design principle 9: GA Operational - The impacts on GA and other civilian airspace users due to ScTMA should be minimised. (Note: This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures.) No Change - no impact.	Medium	MET	No impact or positive impact
Design principle 10: CAS Technical -The classification and volume of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users. (Note: This may include releasing CAS as appropriate.) No Change - no impact.	Medium	MET	No increase (or reduction in) CAS required
Design principle 11: PBN Technical - The route network linking airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. (Note: Where appropriate, the use of RNP should be considered if the fleet mix can support it.) Existing holds are RNAV5 or greater	High	MET	All routes needed are accommodated or the highest RNAV standards used
Design principle 12: AMS Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. (Note: The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable - the need to maximise the utilisation of existing runway capacity) Current hold locations limit environmental benefits by requiring departing aircraft to level off to remain deoonflicted.	High	PARTIAL	Partially aligned with the AMS
Design principle 13: CCO/CCD The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft. No change - CCO and CCD as per todays operation	Medium	PARTIAL	CCO and CDO as per today

Conclusion:
The Do nothing Option represents no change, and will not be progressed.

Option 1: Review existing holds and introduce new radial holds where required.	ACCEPT & PROGRESS	Assessmt matrix ref
Existing holds will be reviewed and kept, amended or removed. Additional radial holding structures will be proposed where required.		
Design Principle 1: Safety — High Safety - The airspace will maintain or enhance current levels of safety No safety issues have been identified with this option.	MET	no significant safety issues identified
Design Principle 2: Resilience — High Operational - The proposed airspace will maintain or enhance operational resilience of the ATC network. Improving the location and/or number of holds will increase the resilience of the airspace	MET	Better than Current
Design principle 3: Capacity — High Operational - The proposed airspace design will yield the greatest capacity benefits from systemisation. Improving the location and/or number of holds will increase the capacity of the airspace	MET	Design option decreases ATCO workload
Design principle 4: Interface — High Technical - The ScTMA airspace design will provide a compatible and optimised interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network. Improving the location and/or number of holds will provide an improved interface between the STATs and airports approach procedures	MET	Minimal or no changes required for compatibility with lower level airspace
Design principle 5: Economic — Medium Economic - The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route. (Note: This includes track mileage / fuel burn / route charges) Aircraft are only required to hold if there is a delay. If there is a delay aircraft will still be reqired to hold albeit the location might change to a more optimal location.	MET	Economic performance increased
Design principle 6: Environmental — Medium Environmental - The proposed ScTMA airspace will facilitate the reduction of CO2 emissions along the entire route. Aircraft are only required to hold if there is a delay. If there is a delay aircraft will still be reqired to hold albeit the location might change to a more optimal location.	MET	CO2 emissions reduced
Design principle 7: Environmental — Low Environmental - Minimise environmental impact to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsors ACP). No change - no impact.	MET	No change in noise impacts below 7000ft
Design principle 8: MoD — Medium Operational - The ScTMA airspace should be compatible with the requirements of the MoD. If a new hold is required for the Eastern element addiional CAS will be required potentially impacting MoD operations	PARTIAL	Minor impact and not safety critical
Design principle 9: GA — Medium Operational - The impacts on GA and other civilian airspace users due to ScTMA should be minimised. (Note: This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures.) If a new hold is required for the Eastern element addiional CAS will be required potentially impacting GA operations	PARTIAL	Minor impact and not safety critical
Design principle 10: CAS — Medium Technical -The classification and volume of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users. (Note: This may include releasing CAS as appropriate.) If a new hold is required for the Eastern element addiional CAS will be required	PARTIAL	Small increase in CAS volume required
Design principle 11: PBN — High Technical - The route network linking airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. (Note: Where appropriate, the use of RNP should be considered if the fleet mix can support it.) Holds will be designed to an appropriate PBN specification	MET	All routes are accommodated howev er an increase in airspace volume is required due to lower
Design principle 12: AMS — High Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. (Note: The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable - the need to maximise the utilisation of existing runway capacity) This option aligns with the AMS	MET	Aligned with the AMS
Design principle 13: CCO/CCD — Medium The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft. Holds will be located to minimise impact CCO. Hold levels will be defined so that they are compatible with CDO	MET	Positive impact on CCO and CDO

Conclusion:

This option will provide the required airport holding structures best aligned with the low-level airport led changes and the en-route changes made by this ACP. However, until the airport led changes are determined it is not possible to define the hold locations and this option is focused on the type of holding structure. Radial holds prove a suitable and compatible delay absorbing structure.

This option is considered a promising candidate and has been **Progressed** to the next Stage.

Option 2: Review existing holds and introduce new lateral delay absorption structures (i.e. point merge).	REJECT	Assessmt matrix ref
Existing holds will be reviewed and kept, amended or removed. Additional lateral delay absoption structures will be proposed where required.		
Design Principle 1: Safety — High Safety - The airspace will maintain or enhance current levels of safety No safety issues have been identified with this option.	MET	no significant safety issues identified
Design Principle 2: Resilience — High Operational - The proposed airspace will maintain or enhance operational resilience of the ATC network. Option 2 requires an additional radial hold and large airspace structure. This large structure will limit the available airspace to address an unplanned event. Therefore, reslience will be reduced	NOT	Worse than current
Design principle 3: Capacity — High Operational - The proposed airspace design will yield the greatest capacity benefits from systemisation. reduce controller workload by simplifying the sequencing of arriving aircraft. This should lead to an increase in capacity	MET	Design option decreases ATCO workload
Design principle 4: Interface — High Technical - The ScTMA airspace design will provide a compatible and optimised interface between the lower level terminal airspace; the upper Free Route Airspace (FRA) and the ATS network. Option 2 requires the introduction of a transition following the merge point, otherwise the sequencing benefit and is lost.	NOT	Significant changes with lower level airspace required for compatability
Design principle 5: Economic — Medium Economic - The proposed ScTMA airspace will facilitate optimised network economic performance of the entire route. (Note: This includes track mileage / fuel burn / route charges) Aircraft will have to flight plan and fuel for the hold and the additional track mileage of the new structure. Therefore fuel uplift is increased.	NOT	Economic performance reduced
Design principle 6: Environmental — Medium Environmental - The proposed ScTMA airspace will facilitate the reduction of CO2 emissions along the entire route. Aircraft will have to flight plan and fuel for the hold and the additional track mileage of the new structure. Therefore CO_2 emissions will increase	NOT	CO2 emissions increased
Design principle 7: Environmental — Low Environmental - Minimise environmental impact to stakeholders on the ground (note: network changes are >7,000ft, the position of the interface with the airport's lower level routes will be determined by the airport, hence impacts below 7,000ft will be addressed in the separate airport sponsors ACP). Increased weight will lead to an increase in noise.	PARTIAL	Change, but no net detrimental impacts on noise below 7000ft
Design principle 8: MoD — Medium Operational - The ScTMA airspace should be compatible with the requirements of the MoD. Option 2 will be contained within existing CAS - no impact.	MET	No impact or positive impact
Design principle 9: GA — Medium Operational - The impacts on GA and other civilian airspace users due to ScTMA should be minimised. (Note: This includes a wide variety of other airspace users such as emergency, recreational, training and sporting aviation. Consider where impacts might be greatest by considering known VFR significant areas and Military-use areas against placement of airspace structures.) Option 2 will be contained within existing CAS - no impact.	MET	No impact or positive impact
Design principle 10: CAS — Medium Technical -The classification and volume of controlled airspace required for the ScTMA should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of the UK airspace users. (Note: This may include releasing CAS as appropriate.) Option 2 will be contained within existing CAS - no impact.	MET	No increase (or reduction in) CAS required
Design principle 11: PBN — High Technical - The route network linking airport procedures with the enroute phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN. (Note: Where appropriate, the use of RNP should be considered if the fleet mix can support it.) Holds and lateral delay absorbtion structures will be designed to an appropriate PBN specification	MET	All routes needed are accommodated or the highest RNAV standards used
Design principle 12: AMS — High Must accord with the CAA's published Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it. (Note: The CAA have stated that this DP is required by all change sponsors. CAP1711 describes what airspace modernisation must deliver including: - the need to increase aviation capacity; - growth to be sustainable - the need to maximise the utilisation of existing runway capacity) This option aligns with the AMS	MET	Aligned with the AMS
Design principle 13: CCO/CCD — Medium The airspace should introduce improved Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO) for all aircraft. Aircraft will have prolonged periods of level flight whilst flying the new airspace structure. Large airspace structure might impact departure routes.	NOT	Negative impact on CCO and CDO compared with today

Conclusion:
The use of lateral delay absorption structures would allow the en-route controllers to present sequenced aircraft to the airport controllers to complete the approach phase of flight. However, these structures are in addition to radial hold(s) and they need a large volume of airspace. Aircraft are required to flight plan the entirety of the airspace structure resulting in an increase in fuel uplift. The sequencing benefit of these structures are lost if they are not coupled with a transition from the merge point to the airfield.
5DP's (2 high) were not met and hence this option is Rejected.

12. Annex E: Airspace Modernisation Strategy Alignment

AMS ref	Description	RAG	Notes
DfT + CAA Objectives Pg. 23	Create sufficient airspace capacity to deliver safe and efficient growth of commercial aviation	G	This ACP aims to deliver safe and efficient growth in capacity
DfT + CAA Objectives Pg. 23	Progressively reduce the noise of individual flights, through quieter operating procedures and, in situations where planning decisions have enabled growth which may adversely affect noise, require that noise impacts are considered through the airspace design process and clearly communicated	G	This ACP proposes changes to the enroute network which will only affect flights above 7000ft. As such, in accordance with the DfT altitude based priorities, noise impacts are not prioritised.
DfT + CAA Objectives Pg. 23	Use the minimum volume of controlled airspace consistent with safe and efficient air traffic operations	G	The volume of airspace required will be minimised. The extant bases of airspace will be reviewed and where possible raised.
DfT + CAA Objectives Pg. 23	In aiming for a shared and integrated airspace, facilitate safe and ready access to airspace for all legitimate classes of airspace users, including commercial traffic, General Aviation and the military, and new entrants such as drones and spacecraft	G	The airspace will be classified to support access to users as appropriate.
DfT + CAA Objectives Pg. 23	Not conflict with national security requirements (temporary or permanent) specified by the Secretary of State for Defence.	G	There is no conflict with national security requirements.
Stakeholders Affected Pg. 26	Passengers- Fewer flight delays and service disruptions at short notice will save time and improve the passenger experience. A more efficient airspace will increase capacity while continuing to improve current high safety standards, leading to better value, including consistent quality of service, and more choice.	G	This ACP aims to introduce more efficient airspace which will increase capacity while continuing to improve current high safety standards.
Stakeholders Affected Pg. 26	Aircraft Operators- the airspace structure is a key determinant of costs, punctuality and environmental performance. More direct and efficient flightpaths will mean lower costs for operators because they will save on fuel and be able to enhance the utilisation of their aircraft. Timely access to appropriate airspace is essential for the maintenance of military capability. Airspace modernisation must enable this while minimising impact on other users. Airspace modernisation is also expected to improve access to airspace for General Aviation, by enabling greater integration (rather than segregation) of different airspace user groups. The same is true for new airspace users such as drones and spacecraft.	G	This ACP aims to meet these objectives. Airline operators and GA have been continuously engaged, with positive feedback. received.
Stakeholders Affected Pg. 26	Airports- the sharing of accurate flight information about traffic using our airspace is expected to improve runway throughput and resilience. Additional airspace capacity will provide airports with the scope to develop their operations in line with their business plans (subject to planning considerations). Enhanced technology combined with updated airspace design enables safe, expeditious and efficient management of increased traffic.	G	This ACP aims to meet these objectives. Improved capacity of the network airspace is a key objective. These designs have been developed in collaboration with the airfields which will assist airports to develop their operations in line with their business plans.
Stakeholders Affected Pg. 26	UK Economy- efficiency and enhanced global connections and emerging aviation technologies can help drive growth.	G	This ACP aims to meet these objectives. Improved capacity, efficiency and reduced environmental impacts are all targets which will help the wider UK economy.

Stakeholders Affected Pg. 26	Communities- airspace modernisation offers environmental improvements because aircraft can climb sooner, descend more quietly and navigate more accurately around populated centres. In some areas, the increase in traffic can lead to an increase in noise, or the concentration of traffic can concentrate noise over a smaller area, which can reduce the areas in which noise is heard and offer the opportunity for respite routes. This means that not every community will benefit, so it is important that noise is managed as well as possible, in adherence to government policy. Airports should also consider whether they can develop airspace change proposals to reduce noise, i.e. to reduce the total adverse health effects of noise. Where aircraft are able to follow more fuel-efficient routes, wider society will also benefit because fewer CO_2 emissions will reduce greenhouse-gas (GHG) impacts.	G	This ACP aims to meet these objectives. Reduced environmental impacts are key targets. Improved airspace allowing CCO/CDOs aim to reduce CO_2 emissions and GHG impacts. The changes proposed are all above FL75 (not withstanding possible release of CAS) hence no significant noise impacts are anticipated.
Ends modernised airspace must deliver Pg. 51	Safety- maintaining a high standard of safety has priority over all other ends to be achieved by airspace modernisation	G	This ACP will maintain the high standard of safety.
Ends modernised airspace must deliver Pg. 51	Efficiency- consistent with the safe operation of aircraft, airspace modernisation should secure the most efficient use of airspace and the expeditious flow of traffic	G	This ACP aims to use the airspace efficiently to enable the expeditious flow of traffic.
Ends modernised airspace must deliver Pg. 51	Integration- airspace modernisation should satisfy the requirements of operators and owners of all classes of aircraft across the commercial, General Aviation and military sectors	G	This ACP aims to use the airspace efficiently to enable the expeditious flow of traffic, including all classes of aircraft across the commercial, General Aviation and military sectors.
Ends modernised airspace must deliver Pg. 51	Environmental performance- the interests of all stakeholders affected by the use of airspace should be taken into account when it is modernised, in line with guidance provided by the Government on environmental objectives, the Air Navigation Guidance 2017, which sets out how carbon emissions, air quality and noise should be considered	G	This ACP aims to be consistent with the objectives in ANG2017. The proposed airspace structures will aim to strike an appropriate balance in accordance with the environmental objectives as set out in the ANG 2017.
Ends modernised airspace must deliver Pg. 52	Defence and security- airspace modernisation should facilitate the integrated operation of air traffic services provided by or on behalf of the armed forces and take account of the interests of national security	G	This ACP aims to meet these objectives. Liaison with the MoD will ensure effective integration of operation of air traffic services provided by or on behalf of the armed forces and take account of the interests of national security.
Ends modernised airspace must deliver Pg. 52	International alignment- airspace modernisation should take account of any international recommended practices or obligations related to the UK's air navigation functions, such as those from ICAO and the EU.	G	This ACP has considered all international recommended practices and obligations.
Ends modernised airspace must deliver Pg. 52	Airspace **must** enable growth	G	This ACP aims to enable future growth.

End of document