West Airspace Deployment L6203
ACP-2017-70

London Airspace Management Programme 2
Deployment 1.1

Gateway Documentation
Stage 4: Update & Submit

Step 4B: Submit:
Airspace Change Proposal

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References

Ref No	Description	Hyperlinks
1	CAA Airspace Modernisation Strategy (CAP 1711)	CAP1711
2	UK Aeronautical Information Publication	Link
3	FRA D2 ACP-2019-12	Link
4	Airspace Change Guidance (CAP1616)	Link
5	Air Navigation Guidance 2017	Link
6	OSEP D5 ACP-2021-91	Link
7	2014 SUA - Safety Buffer Policy for Airspace Design Purposes	Link
8	Air Traffic Services Safety Requirements (CAP 670)	Link
9	Stage 1 Statement of Need	Link
10	Stage 1 Design Principles	Link
11	Stage 2 Design Options	Link
12	Stage 2 Design Principle Evaluation	Link
13	Stage 2 Initial Options Appraisal	Link
15	Stage 3 Consultation Strategy	Link
16	Stage 3 Consultation Document	Link
17	Stage 3 Full Options Appraisal	Link
18	Stage 3D Collate and Review Responses document	Link
19	Stage 4A Update Design	Link
20	Stage 4A Final Options Appraisal	Link

Contents

1. Introduction

1.1 The modernisation of the airspace across the whole of the UK is a long-term strategy of the CAA and the UK Government (AMS) (Ref 1). One of the 15 initiatives within the AMS is the fundamental redesign of the routes in and around the southern UK. NATS, and the airports across the south, are all working on separate, but co-ordinated, airspace changes proposals to meet these AMS objectives, via FASI-S airspace change proposals.

1.2 Modernising the ATS route network involves systemising traffic flows to allow optimal profiles to be flown, this reduces interactions between aircraft, reduces Air Traffic Control (ATC) workload and in turn enable an increase in network capacity.

1.3 This ACP is sponsored by NATS and proposes the systemisation of lower airspace across the southwest of England and most of Wales. In the proposed design a new systemised route structure has been created between 7000ft and 24,500ft, with Free Route Airspace (FRA) established above 24,500ft (FL245).

1.4 The airspace routinely accommodates flights arriving to and departing from several aerodromes within the area, including Cardiff, Exeter and Bristol Airports. The airspace is used extensively by aircraft arriving at and departing from airports both within and outside the area. These arriving and departing aircraft will be descending from or climbing into the upper airspace (FL245 and above).

1.5 Many of the airports that feed aircraft into this airspace, from beneath or from elsewhere in the UK, are planning to modernise their low-level arrival and departure routes, to ensure they can meet the need for sustainable future growth and in line with AMS objectives. Modernising the network will ensure their requirements can be met, and that the overlying network does not become a constraint on future growth.

1.6 This airspace change is being progressed concurrently with the proposed introduction of Free Route Airspace (FRA) in the higher-level airspace (FRA D2 ACP-2019-12 (Ref 3). These ACPs are interdependent and cover a common geographic region. Consultation has been conducted concurrently and the airspace changes must be implemented simultaneously given the interdependencies between the two airspace designs.

1.7 The changes proposed in this ACP affect flights above FL70. Hence in accordance with the Levels as defined in CAP1616 (Ref 4), this proposal is categorised as a Level 2B change.

1.8 In line with the requirements for a Level 2B change the environmental impact assessment has been conducted on the basis of CO_2e emissions. In accordance with Air Navigation Guidance 2017 (Ref 5), there would be no perceptible change to noise impacts to stakeholders on the ground, so no noise analysis has been conducted.

1.9 The intent of this document is to satisfy the requirements of CAP1616 Stage 4B: submit Airspace Change Proposal (ACP) to the CAA (Civil Aviation Authority). The CAA reference is ACP-2017-70. The link to the CAA progress page is here.

2. Executive Summary

2.1 This implementation is in co-ordination with Free Route Airspace Deployment 2 (FRA D2), which proposes to change the airspace above the LD1.1 region above 24,500ft. The consultation for these two ACPs was run simultaneously, and the implementation of these Airspace Changes is inter-dependent on both.

2.2 The objectives of this project are to update the route network to deliver specific initiatives of the CAA's Airspace Modernisation Strategy (Ref 1); and to provide benefits in capacity whilst minimising environmental impacts. The key factors which have underpinned the design are to:

- Modernise the lower airspace in the identified geographical area by introducing a systemised ATS route structure using PBN (Performance Based Navigation)
- Optimise alignment and connectivity of the ATS route network with each airport's airspace structures
- Provide a safe and efficient interface with FRA airspace above

2.3 Due to the level of the proposed changes, assessment of environmental impacts is limited to CO_2e emissions.

2.4 The area covered by this ACP is shown in Figure 1 and covers the southwest of England and most of Wales. The ACP proposes changes to the airspace and route structure which will change aircraft flight profiles between Flight Level (FL) 70 - FL245.

2.5 At Stage 1 we developed Design Principles via engagement with targeted stakeholder groups (Ref 10).

2.6 At Stage 2 we developed design options, via further engagement with the same targeted stakeholders. We evaluated these against the Design Principles and developed 2 design options which were progressed to consultation (Ref 11, 12 & 13).

2.7 At Stage 3 we consulted with stakeholders identified in our consultation strategy and this informed our selection of the final design, which is to implement LD1.1 systemised routes with FRA above from FL245 (Ref 15, 16, 17 &18).

2.8 The airspace affected starts at/above 7,000ft (equivalent to FL70 when barometric pressure is 1013 hectopascals). The proposal seeks optimal alignment and connectivity of the ATS route network with each airport's airspace structures, such that the network capacity should not be a significant constraint on airport capacity and environmental impacts are minimised.

2.9 In order to provide connectivity with the arrivals/departures to/from Bristol, Cardiff, Exeter and other airports into the proposed systemised enroute network it is necessary to amend some existing Standard Instrument Departures (SIDs) & Standard Arrival Routes (STARs). No aircraft trajectories below 7,000ft would be changed as a result of the changes proposed herein. This document describes the proposed changes and provides examples. The impacts of the proposed changes are assessed and discussed.

2.10 Additionally, we have taken this opportunity to perform a thorough review of the controlled airspace required, to deliver benefit to other airspace users where possible. As a result, this ACP proposes changes to controlled airspace which would result in a net release of ~108 cubic nautical miles (NM^3) of controlled airspace.

2.11 Safety and human factor assessments determine there are no increased risks to safety from this proposal. This change is expected to enable more efficient flight planning.

2.12 The proposal is expected to enable annual savings of 1,452 tonnes of fuel in 2023 (value £662,809[1]), increasing to an annual saving of 2,020 tonnes of fuel in 2033 (value £922,090). This equates to 4,617 tonnes of CO_2e (2023) and 6,422 tonnes by 2033[2].

Secretary of State Call-In

2.13 Typically, the CAA is the decision maker in Airspace Change Proposals. However, the Secretary of State may determine that a proposal will be decided by him/her if a request is made to do so and any one of the below four Call-In criteria apply. (CAP1616 Pg70 Para 250 et seq) If the proposed change:

- is of strategic national importance
- could have a significant impact (positive or negative) on the economic growth of the UK
- could both lead to a change in noise distribution resulting in a 10,000net increase in the number of people subjected to a noise level of at least 54 dB LAeq 16hr and have an identified adverse impact on health and quality of life, or
- could lead to any volume of airspace classified as Class G being reclassified as Class A, C, D or E.

2.14 The Secretary of State has provided statutory guidance on the meaning of these criteria. For the LD1.1 ACP technically the 4th criteria applies. However, NATS position is that this is mitigated significantly by a net decrease in controlled airspace of ~108 NM[3], which will be reclassified to Class G. Furthermore, the response to the consultation demonstrates that the overall reduction in controlled airspace will be beneficial to the General Aviation community.

[1] This was based on the IATA jet fuel price of 9 July 2021, at $634US per tonne and converted to GBP at 0.72£/$11 (£456 per tonne) and presumes a constant fuel price and exchange rate.

[2] Traffic forecasts have been updated to recognise the impact of COVID-19 on the aviation industry

3. Current Airspace Description

This section describes the current airspace which forms the baseline (do nothing) scenario. It should be noted that "doing nothing" is useful as a baseline for comparison, but it was discounted at Stage 2 as a viable option as it would not deliver the aims of the AMS.

Given the complexity and magnitude of the changes proposed in this ACP and the intricacies of the airspace at specific interfaces / airports, detailed description of current airspace and relevant procedures is included within the proposed airspace description (Section 5). This enables a more effective presentation of the proposed changes.

3.1 Structures and Routes

3.1.1 This proposal concerns the airspace in the area shown in Figure 1 and the route network contained within (FL70-FL245).

3.1.2 This airspace routinely accommodates flights arriving to and departing from the airports of Bristol, Cardiff and Exeter Airports, as well as numerous smaller aerodromes within the area.

3.1.3 Additionally, the airspace is used extensively by aircraft arriving at and departing from airports outside the area, including all London airports, Birmingham, Liverpool, Manchester, East Midlands and Dublin.

3.1.4 These arriving and departing aircraft would be descending from or climbing into the upper airspace (FL245 and above).

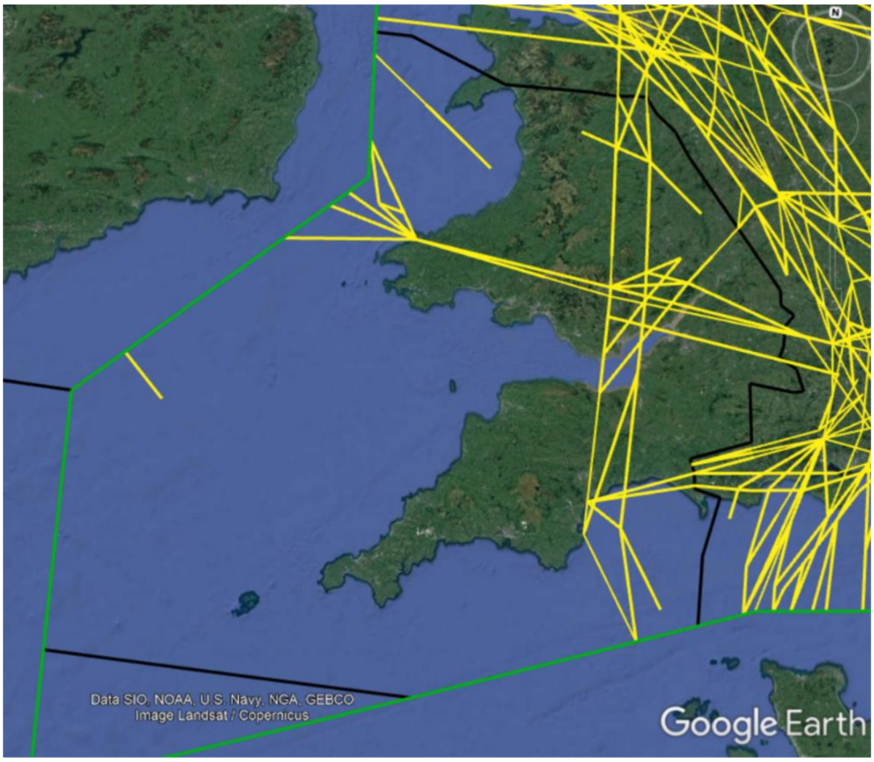


Figure 1 Current lower ATS routes (FL70-FL245 within the LD1.1 area[3].

3.1.5 The LD1.1 airspace up to FL245 is part of the London Flight Information Region (FIR) and interfaces with the Irish, French (Brest) and the Channel Islands Control Zone FIRs. The traffic is comprised of aircraft arriving/departing from UK airports whether originating from airports within the lateral boundary of the LD1.1 area, or airports outside the area, and overflights such as transatlantic flights to/from continental Europe.

[3] The black outline shows FRA airspace (from FL245). The changes required in the lower airspace for LD1.1 are predominantly within this defined area; however, to provide connectivity to legacy networks at the northern and eastern interfaces, the routes extend beyond this area. All maps within this document will show the FRA D2 area for reference.

3.1.6 Currently all aircraft flight plan to fly along the published ATS route structure. The existing ATS route structure was historically based on ground-based radio navigation beacons, many of which are being withdrawn from service, due to age and redundancy.

3.1.7 The existing ATS route network spacing is based on old standards which required 12nm spacing between adjacent routes for them to be considered separated. The improvements to navigational accuracy mean that new routes can be safely positioned more closely to each other, which can enable more efficient utilisation of the airspace.

3.1.8 Figure 3 below shows the flight path density distribution of flights for a typical pre-pandemic summer week (11-18th August 2019): This shows the typical flows of traffic in the LD1.1 airspace.

3.1.9 Modern satellite navigation now makes navigation between any points possible and there is much less reliance on ground-based navigation beacons. Using modern Performance Based Navigation (PBN) it is commonplace for air traffic control (ATC) to allow aircraft to route direct to a point (termed a 'tactical direct'), to improve efficiency as aircraft transit through UK airspace.

3.1.10 The use of the designated entry/exit points (termed coordination points (COPs) at the FIR boundary, and the influence on flightpaths of some navigation beacons and the ATS route structure can be seen clearly in Figure 2.

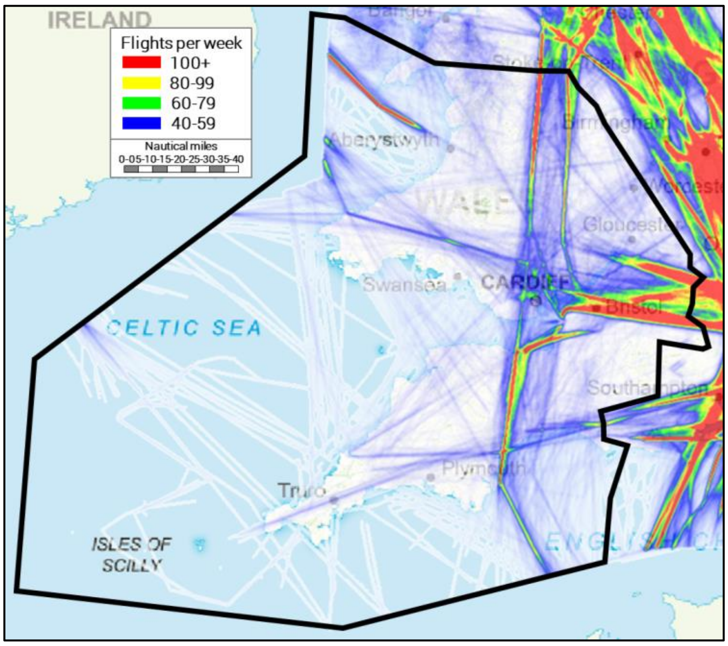


Figure 2 Current traffic flows for LD1.1 airspace (FL70-FL245) (Aug 2019)

3.1.11 Within the extant LD1.1 airspace, traffic flows north-south on two parallel routes; N864 & N862. Traffic to/from the south joins via a COP on the Brest/Channel Islands border, traffic to/from the north joins the Manchester TMA.

3.1.12 East-west traffic from Ireland travels on ATS route Q63 routing STU – BCN – CPT.

3.1.13 In the southern sectors, traffic is routed on ATS route L620 or N17 (eastbound). There are no ATS routes between FL70-FL245 in the southwest portion of the airspace (Sector 9).

3.1.14 For reference, the existing UK ATS route structure is defined in detail in the following sections of the UK Aeronautical Information Publication (AIP) ENR 3 ATS ROUTES (Ref 2).

3.2 Airspace Usage and proposed effect

3.2.1 The proportion of aircraft types or airlines is not expected to change as a consequence of this airspace change. The following sections break down the most common aircraft types and airlines utilising the LD1.1 airspace in 2019.

Illustration of numbers of flights

3.2.2 In 2019 (pre-pandemic) 469,980 flights transited the LD1.1 airspace region. The airspace usage by airline is given below.

Airline	Callsign	%
Ryanair	RYR	17.8%
easyJet	EZY	10.4%
Aer Lingus	EIN	8.6%
British Airways	BAW	8.4%
TUI Airways	TOM	4.3%
Jet2	EXS	4.1%
United Airlines	UAL	4.1%
American Airlines	AAL	4.0%
Delta Air Lines	DAL	3.5%
Virgin Atlantic	VIR	2.8%
Air France	AFR	2.7%
KLM	KLM	2.1%
Lufthansa	DLH	1.8%
Air Canada	ACA	1.6%
Swissair	SWR	1.2%
Norwegian Airlines	NRS	1.2%
Stobart Air	STK	1.0%
Air Transat	TSC	0.9%
Iberia	IBS	0.6%
Norwegian Shuttle	NAX	0.5%

Table 1 Percentage of flights by airline

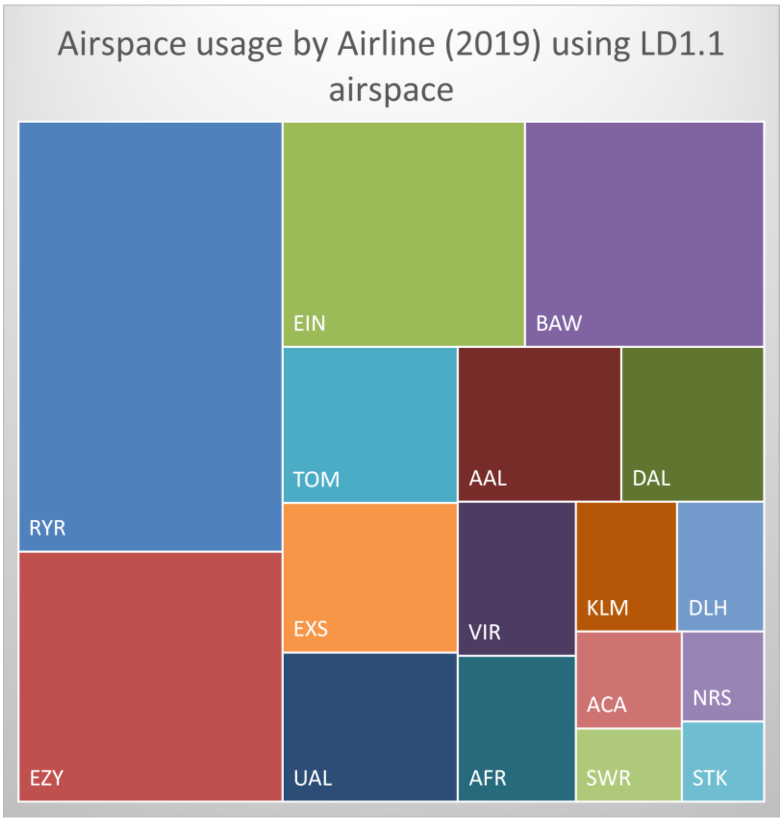


Figure 3 Airlines with greater than 1% of flights

3.2.3 Table 1 shows the percentage usage of the airspace for the top 20 airlines. Figure 3 illustrates the proportions of flights for those airlines having more than 1% of the total (in 2019).

Fleet Mix

3.2.4 The Fleet mix giving the percentage of each of the top 50 aircraft types using the airspace is given below in Table 2.

3.2.5 The fleet mix above is based on traffic from 2019 (pre-pandemic) with the following changes:

- B744 and A380 aircraft types for British Airways have been replaced with 60% B772 and 40% B788
- A318 aircraft types for British Airways were removed from our sample
- A340 aircraft types for Virgin were replaced with B789
- The sample includes FlyBe DH8D, so it is likely that the future proportion of DH8B would be reduced

Aircraft Type	Daily Count	%	Aircraft Type	Daily Count	%
B738	299	20.3%	E190	11	0.7%
A320	217	14.7%	RJ85	11	0.7%
B772	104	7.1%	MD11	9	0.6%
A319	70	4.8%	E135	8	0.5%
B763	55	3.7%	JS41	8	0.5%
B789	55	3.7%	A359	7	0.5%
B77W	53	3.6%	B737	7	0.5%
A333	50	3.4%	GLF4	7	0.5%
B788	41	2.8%	B38M	6	0.4%
DH8D	38	2.6%	GLF5	6	0.4%
A332	34	2.3%	B462	5	0.3%
B744	33	2.2%	E75L	5	0.3%
A321	30	2.0%	F2TH	5	0.3%
B752	30	2.0%	GLEX	5	0.3%
E145	25	1.7%	A346	4	0.3%
E195	22	1.5%	AT75	4	0.3%
AT76	21	1.4%	C25A	4	0.3%
E75S	19	1.3%	F900	4	0.3%
B764	18	1.2%	LJ45	4	0.3%
A388	15	1.0%	C55B	3	0.2%
B77L	14	1.0%	C68A	3	0.2%
A343	13	0.9%	CL60	3	0.2%
B748	12	0.8%	E55P	3	0.2%
BE20	12	0.8%	GL5T	3	0.2%
B733	11	0.7%	A21N	2	0.1%

Table 2 Fleet Mix - top 50 aircraft types

3.2.6 The proposed effect will modernise the airspace in the region, with a systemised PBN route structure which enables very accurate track conformance to routes. This should decrease controller workload by reducing the amount of tactical intervention required whilst providing environmental benefits and increasing safety by design.

3.3 Operational efficiency, complexity, delays and choke points

3.3.1 The area surrounding the Compton (CPT) navigation beacon currently has a high density of conflicting routes, which increases the requirement for tactical intervention by controllers. This proposal seeks to review and reform the routings in this area of airspace to reduce the operational complexity.

3.3.2 The UK Danger Area EG D201 complex borders the western interface of the area with Ireland. This complex is sub-divided into sections. The current design has options for Dublin arrival flows from the south and east when certain configurations of danger area are active. However, when either or both of EG D201F & G areas are activated above FL145, there are no flight planning options for Dublin Arrivals from the south and east. Furthermore, LTMA westbound Oceanic traffic that routes along N14 is also impacted and has to flight plan alternative routes. For this reason, EIDW arrivals that overfly the UK generally flight plan via BAGSO. This increases track distance and means aircraft are unable to take advantage of tactical re-routes when a clearance to transit EG D201 is offered by the Danger Area Range Operating Authority. This proposal, working closely with the MoD, seeks to rectify this issue.

3.3.3 There is a complexity and workload issue at the interface between London ACC and Brest ACC (West interface), specifically around the single COP SALCO.

3.4 Safety issues

3.4.1 There is an identified risk within the current operation, where specific aircraft FMS turn anticipations have resulted in aircraft routing close to an active Special Use Airspace (SUA). This risk is being managed tactically to a tolerable level; however, a permanent airspace design solution has been incorporated in this proposal which is designed to prevent this situation from occurring. This specifically relates to the risk of aircraft turning inside of waypoint PEMOB and flying in close proximity to EG D201 danger area complex.

3.4.2 There are no other specific safety issues associated with any of the routes and structures related to this airspace change proposal.

3.4.3 Ensuring the safety of the proposed changes is a priority for NATS. NATS has a dedicated Safety Manager for the London Airspace Modernisation Programme who ensures that the safety representatives from the Safety & Airspace Regulation Group (SARG) have oversight of the safety assurance process. Section 9 contains further details on the safety assessment for this proposal.

3.5 Human Factors

3.5.1 There are no specific human performance issues associated with this airspace change proposal.

3.5.2 NATS has a dedicated Human Factors Specialist for the London Airspace Modernisation Programme, who ensures that any potential impact on human performance is assessed and mitigated as far as practically possible, as part of the Human Factors Assurance Process. Section 9 contains further details on the human performance assessment for this proposal.

3.6 Environmental issues

3.6.1 There are no specific environmental issues associated with any of the routes or structures related to this project to be resolved by this airspace change proposal.

4. Statement of Need

4.1 The Statement of Need v2 (Ref 9) submitted in October 2018 is as follows:

(This SoN supersedes DAP1916 ref E42665 submitted 02 Nov 17)

Current situation

The ATS route network serving the UK is managed by the en route ANSP NATS, which handled 2.5m flights in 2017. In the southern UK this is handled by Swanwick at London Area Control (LAC), in the wider London and Southeast region by London Terminal Control (LTC).

Issue or opportunity to be addressed, and the cause

Today's network has evolved over time and does not exploit modern navigation technology. It does not provide capacity for the long-term growth in aviation.

Many airports served by our network plan to change their low-level airspace structures to better meet their needs, driven by increasing demand by the flying public and the carrier airlines. This leads to the increased use of modern aircraft with flight and navigation performance far exceeding that of the types for which the network was originally designed.

There is an opportunity to enable significant benefits in capacity and environmental impacts by taking those needs and changing the network to suit.

Desired outcome

Optimal alignment and connectivity of the ATS route network with each airport's airspace structures, such that network capacity should not be a significant constraint on airport capacity and environmental impacts are minimised.

Specific challenges

Will be a very large-scale undertaking – the main region of interest is likely to be from the Midlands to the FIR boundaries in the south and east but it may go further still in places. Design and implementation challenges are proportional to the extent of the change – a clean sheet redesign of a large region would have the most challenges but the most potential benefit. Each airport would be responsible for their local procedures at lower levels, with NATS being responsible for the higher level ATS route network. This proposal relates to the latter, however, some level of co-ordination will be required with airport-led design.

5. Proposed Airspace Description

5.1 Objectives/ requirements for Proposed Design

5.1.1 The objectives of this project are:

- to update the route network to deliver specific initiatives of the CAA's Airspace Modernisation Strategy (Ref 1)
- to provide benefits in capacity whilst minimising environmental impacts

5.1.2 The requirements for this proposal are:

- modernise the lower airspace in the identified geographical area by introducing a systemised ATS route structure using PBN (Performance Based Navigation)
- optimal alignment and connectivity of the ATS route network with each airport's airspace structures
- provide a safe and efficient interface with FRA airspace above

5.1.3 The Design Principles for this proposal are:

- DP0 Safety – Is always the highest priority
- DP1 Operational – The airspace will enable increased operational resilience
- DP2 Economic – Optimise network fuel performance
- DP3 Environmental – Optimise CO_2e emissions per flight
- DP4 Environmental - Minimising of noise impacts due to LAMP influence will take place in accordance with local needs
- DP5 Technical - The volume of controlled airspace required for LAMP should be the minimum necessary to deliver an efficient airspace design, taking into account the needs of UK airspace users
- DP6 Technical - The impacts on GA and other civilian airspace users due to LAMP will be minimised
- DP7 Technical - The impacts on MoD users due to LAMP will be minimised
- DP8 Operational - Systemisation will deliver the optimal capacity and efficiency benefits
- DP9 Technical - The main route network linking Airport procedures with the En Route phase of flight will be spaced to yield maximum safety and efficiency benefits by using an appropriate standard of PBN
- DP10 Technical - Accords with the CAA's published Airspace Modernisation strategy (CAP1711) and any current or future plans associated with it (this Design Principle was added by CAA request)

5.2 Proposed New Airspace/ Route Definition and Usage

5.2.1 This is a significant airspace change, covering a large geographical area with a full redesign and modernisation of all routes within. This section will describe the changes being proposed, describing the LD1.1 airspace itself as well as the interfaces with airspace above, below and surrounding the LD1.1 area.

5.3 LD1.1 Airspace -overview

5.3.1 This proposal seeks to replace the extant route structure with a systemised PBN route network from FL70 to FL245. Figure 4 shows the proposed LD1.1 airspace.

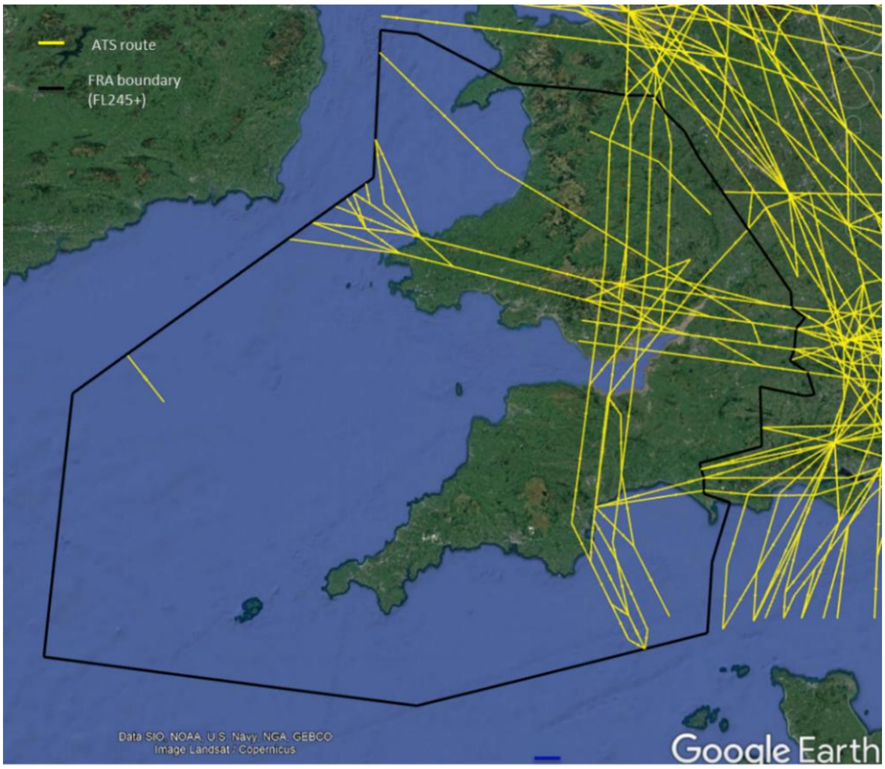


Figure 4 Proposed LD1.1 route structure, systemised PBN routes FL70-FL245

5.3.2 The principal network is formed by 4 north-south and 5 east-west flows up to FL245

5.3.3 Details of the interfaces with adjoining airspace structures, SIDs and STARs for airports, and the adjacent ANSPs are given in sections 5.6, 5.7, 5.8, 5.9, 5.10, 5.11, 5.12 & 5.13 below. Aerodromes outside of controlled airspace will still have the ability to connect with the proposed network in a similar manner to today.

5.3.4 Above FL245 is free route airspace where flight planning is not constrained by an ATS route structure (to be implemented concurrently as proposed in FRA D2 ACP (Ref 3)).

5.3.5 This network would be compatible with the current radar separation standard, keep aircraft safely separated with minimal ATC intervention and relies on the extant terminal delay absorption structures (holds). The ATS route spacing is based on CAP1385 route separation guidance assuming a 5nm radar environment.

5.3.6 There is demand for two main flows of traffic through the region; one north-south and the other east-west. These traffic flows have been systemised through enhanced route design, as illustrated in Figure 4. Further detail is described in the Interface sections below. En-route holding facilities have been designed where required along these routes, for details see Appendix 1.

5.3.7 Details of all the proposed route changes can be seen in the draft AIP (Appendix 1).

5.4 Changes to Controlled Airspace and Special Use Airspace

5.4.1 The proposed airspace design requires some changes to the volume of controlled airspace (CAS) and special use airspace. This includes the introduction of some new areas of controlled airspace and the release of other areas (to Class G – uncontrolled airspace). See Appendix 29.

5.4.2 Where new CAS is required, this is to facilitate the safe operation of the proposed routes. Usually this involves a lateral expansion (widening) of the airspace to accommodate more parallel systemised routes.

5.4.3 Where CAS has been realigned or new CAS proposed, the existing classification or classification of immediately adjacent CAS has been adopted. This maintains the level of safety assurance within the current network (in relation to the protection afforded to IFR traffic due to the airspace classification) which aligns with Design Principle 0 (DP 0). Additionally, it addresses consultation feedback which highlighted the need to simplify airspace structures[4] (See 3D Collate and Review Responses document - Ref 18).

5.4.4 Due to improvements in aircraft performance and navigational accuracy, there are many areas where the controlled airspace bases can be raised, thus enabling the reclassification of controlled airspace to Class G.

5.4.5 The proposed CAS changes result in a net decrease of ~108 cubic nautical miles of CAS (below FL195).

5.4.6 This section describes where the airspace is proposed to change. Note that as a result of rationalisation of the airspace numbering of the CTA regions will change, some new areas will be created, and some will be merged.

5.4.7 The Class C airspace structures between FL195 and FL245 will be updated to include the proposed lateral extent of the lower Control Areas (CTAs), as well as the lateral reduction in size of the Temporary Reserved Areas (TRAs). The West and Midlands CTAs define the airspace between FL195 and FL245 but as all airspace above FL195 is Class C, this would not be a material change.

5.4.8 The changes proposed to CAS in the STU, NITON, Cotswold and Daventry CTAs are detailed in Figure 5 and Table 3.

CAS being changed	Summary of change	Net volume changed (nm^3)	Reason
STU CTA 1 See Figure 5	Lateral increase south	-161	Widened to give CAS containment for proposed systemised ATS route structure
	Base raise from FL145 to FL155		Historic traffic data/ trajectory modelling/SME input for climb and descent profiles
STU CTA 2 See Figure 5	Lateral increase south	-12	Changes to give CAS containment for proposed systemised ATS route structure
	Base raised from FL125 to FL145		Historic traffic data/ trajectory modelling/SME input for climb profiles
STU CTA 3 See Figure 5	lateral increase north and south	-29	Changes to give CAS containment for proposed systemised ATS route structure
	Raise base from FL95 to FL125		Historic traffic data/ trajectory modelling/SME input for climb/descent profiles
STU CTA 4 See Figure 5	Lateral increase to the north and south	+21	Changes to give CAS containment for proposed systemised ATS route structure
	No change to base level		Historic traffic data/ trajectory modelling/SME input for climb/descent profiles

Table 3 Proposed changes to Strumble (STU) CTA controlled airspace

[4] If the classification of proposed CAS differed from current classification a separate CTA would be required for each which would result in a complex series of airspace structures.

CAS being changed	Summary of change	Net volume changed (nm³)	Reason
NITON CTA 6	Minor lateral increase in south-eastern corner	+ <1	Changes to give CAS containment for proposed systemised ATS route structure
NITON CTA 7	Minor lateral increase in south-western corner	+ <1	Changes to give CAS containment for proposed systemised ATS route structure
NITON CTA 9/10/11/12 See Figure 5	Southern portion of NITON CTA 9 adjacent to CTA 10 reduced in size laterally to the east, adjacent areas CTA 10/11/12 reduced in size laterally and base level of FL145 applied to all portions Central Portion of NITON CTA 9 raised to FL155 and reduced in size laterally east and west, with increases laterally in the northern portion. Additional FL175 fillets added centrally on the eastern and western sides. Northern portion base level retained at FL145, lateral increase east and west.	-187	Changes to give CAS containment for proposed systemised ATS route structure Historic traffic data/ trajectory modelling/SME input for climb/descent profiles
NITON CTA 8 See Figure 5	Lateral extension to the east	+3	Changes to give CAS containment for proposed systemised ATS route structure
	No change to base level		Historic traffic data/ trajectory modelling/SME input for climb profiles

Table 4 Proposed changes to NITON CTA controlled airspace

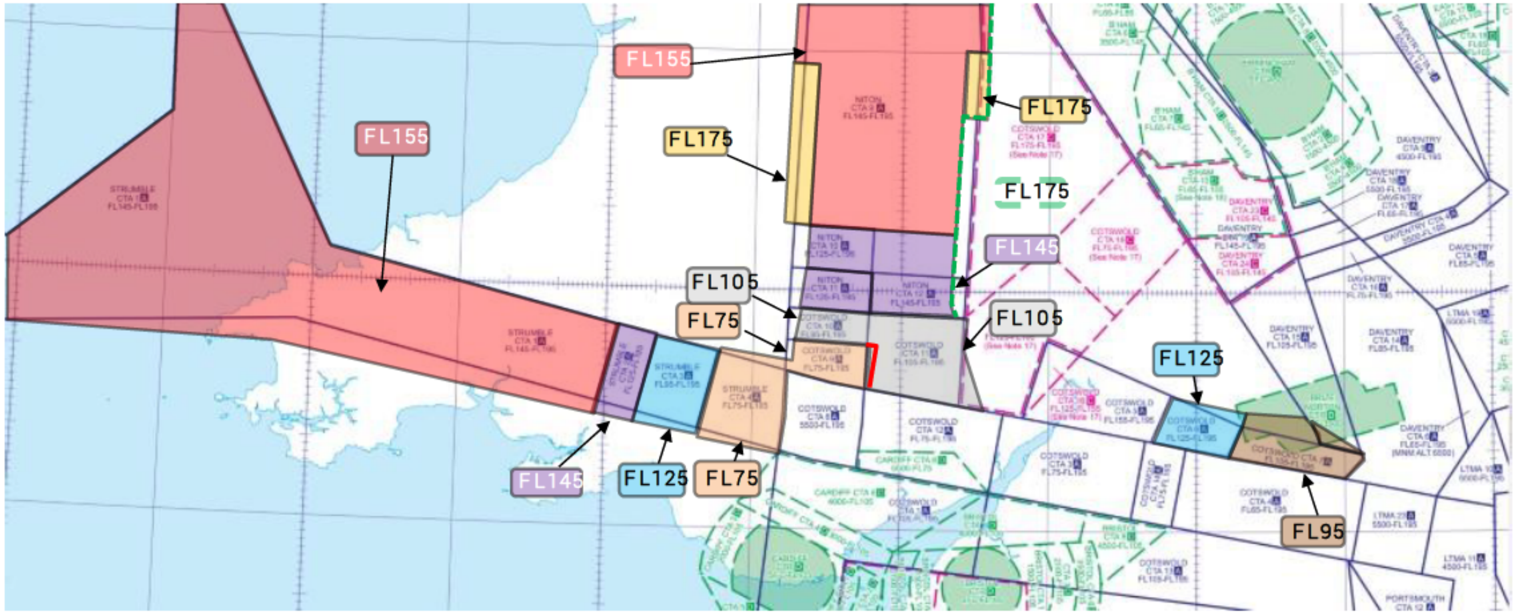
CAS being changed	Summary of change	Net volume changed (nm³)	Reason
Cotswold CTA 13 See Figure 5	Lateral increase to the south and reduction in size of TRA002	+23	Changes to give CAS containment for proposed systemised ATS route structure
	Base to match adjoining CTA13 (FL105)		Historic traffic data/ trajectory modelling/SME input for climb/descent profiles
Cotswold CTA 6 See Figure 5	Lateral increase north	+10	Changes to give CAS containment for proposed systemised ATS route structure
	No change to base level		Historic traffic data/ trajectory modelling/SME input for climb/descent profiles
Cotswold CTA 9 See Figure 5	Lateral reduction in width on the west side. Minor lateral extension to the east	+3	Changes to give CAS containment for proposed systemised ATS route structure
	No change to base level		Historic traffic data/ trajectory modelling/SME input for climb/descent profiles
Cotswold CTA 10 See Figure 5	Lateral reduction in width on the west side	-12	Changes to give CAS containment for proposed systemised ATS route structure
	Base raised from FL95 to FL105		Historic traffic data/ trajectory modelling/SME input for climb/descent profiles
Cotswold CTA 11 See Figure 5	Lateral increase in width to the east; lateral reduction in line with CTA 9		Changes to give CAS containment for proposed systemised ATS route structure and Cardiff STAR
	No change to base level		Historic traffic data/ trajectory modelling/SME input for climb/descent profiles
Cotswold CTA 7 See Figure 5	Lateral increase north	+49	Changes to give CAS containment for proposed systemised ATS route structure
	Base lowered to FL95		Historic traffic data/ trajectory modelling/SME input for climb/descent profiles

Cotswold CTA 15 See Figure 5	Lateral reduction in size in line with Cotswold CTA 11	-7	Segment removed to avoid overlap with revised CTA 11, changes to give CAS containment for proposed systemised ATS route structure
Cotswold CTA 17 See Figure 5	Realignment coincident with amended NITON CTAs	+14	Reduced to avoid overlap in accordance with increased lateral areas of revised NITON and Cotswold CTAs
Cotswold CTA 5	Minor realignment north coincident with Cotswold CTA 6	+<0.1	Changes to give CAS containment for proposed systemised ATS route
Cotswold CTA 16	Minor realignment coincident with revised Cotswold CTA 5	+<0.01	Changes to give CAS containment for proposed systemised ATS route

Table 5 Proposed changes to Cotswold CTA controlled airspace

CAS being changed	**Summary of change**	**Net volume changed (nm³)**	**Reason**
Daventry CTA 15 See Figure 5	Lateral reduction in size in line with Cotswold CTA 7	-7	Reduction to avoid overlap with revised Cotswold CTA 7, changes to give CAS containment for proposed systemised ATS route structure

Table 6 Proposed changes to Daventry CTA controlled airspace



STU CTA 1
Lateral increase south, base raise from FL145 to FL155.
NITON CTA 9
Lateral changes, reduced in southern portion and increased in northern portion.
Base raised from FL145 to FL155.

STU CTA 2
Base level FL125 raise to FL145, lateral increase south.
NITON CTA 10/11/12 & Portion of NITON CTA 9
Lateral reduction east and west, base raise from FL125 to FL145.

STU CTA 3
Raise base from FL95 to FL125, lateral increase north and south.
Cotswold CTA 6
Lateral increase north.

Revised Cotswold CTA 17 boundary.

Cotswold CTA 9/10/11, STU CTA 4
Lateral changes in size.
Base raised from FL75/FL95/FL105 to FL105.

Cotswold CTA 7
Lateral Increase north.
Base lowered to FL95.

NITON CTA 9
Portions extended laterally east/west.
Base raised to FL175

STU CTA 4
Lateral increase north/south
Cotswold CTA 9
Minor lateral reduction

Figure 5 CAS changes in STU, Cotswold, Niton and Daventry CTA

5.4.9 The proposed changes to Berryhead CTA are described in Table 7 below and shown in Figure 6.

CAS being changed	**Summary of change**	**Net volume changed (nm³)**	**Reason**
New BHD CTA 7 See Figure 6	New CTA established with a base of FL75. (max width 4nm, for all the BHD areas below)	+38	Changes to give CAS containment for proposed systemised ATS route structure. Historic traffic data/ trajectory modelling/SME input for climb/descent profiles.
New BHD CTA 8 See Figure 6	New CTA established with a base of FL95.	+46	Changes to give CAS containment for proposed systemised ATS route structure. Historic traffic data/ trajectory modelling/SME input for climb/descent profiles.
New BHD CTA 9 See Figure 6	New CTA established with a base of FL105.	+82	Changes to give CAS containment for proposed systemised ATS route structure. Historic traffic data/ trajectory modelling/SME input for climb/descent profiles.
New BHD CTA 10 See Figure 6	New CTA established with a base of FL125.	+75	Changes to give CAS containment for proposed systemised ATS route structure. Historic traffic data/ trajectory modelling/SME input for climb/descent profiles.
Berry Head CTA 5 See Figure 6	Volume extended laterally to the west and east and divided laterally north/south.	+8	Changes to give CAS containment for proposed systemised ATS route structure. Historic traffic data/ trajectory modelling/SME input for climb/descent profiles.
Berry Head CTA 4 See Figure 6	Volume reduced laterally in line with amendment to BHD CTA 5.	-21	Changes to give CAS containment for proposed systemised ATS route structure.

Table 7 Proposed changes to BerryHead (BHD) CTA controlled airspace

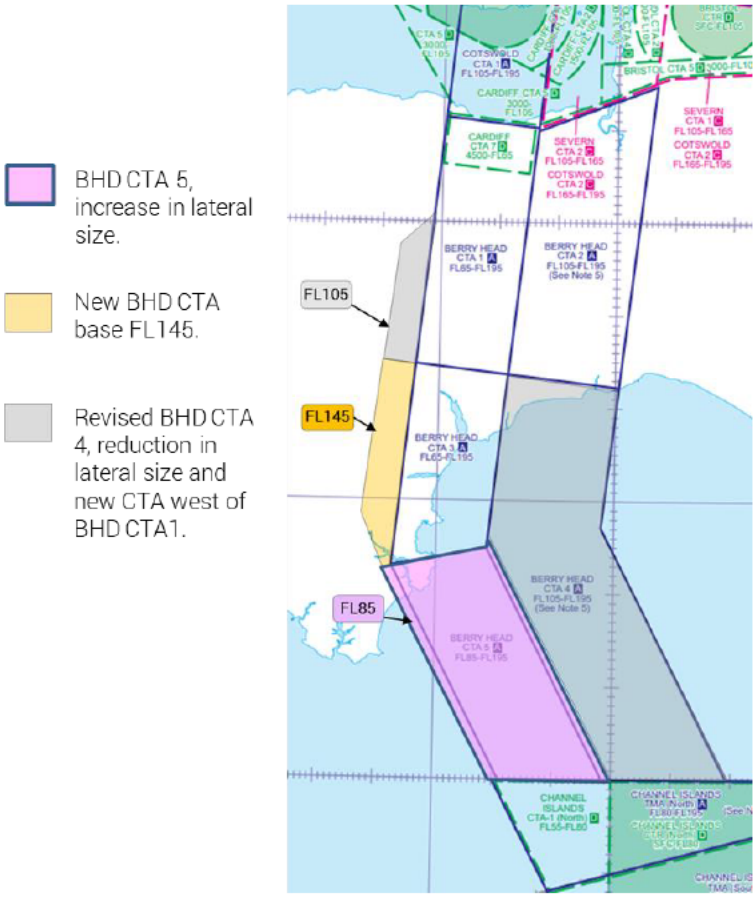


Figure 6 Proposed CAS changes to BHD CTA

5.4.10 The widening of the STU and BHD CTAs require TRA001 to be modified as shown in Figure 7 to match the proposed new boundary.

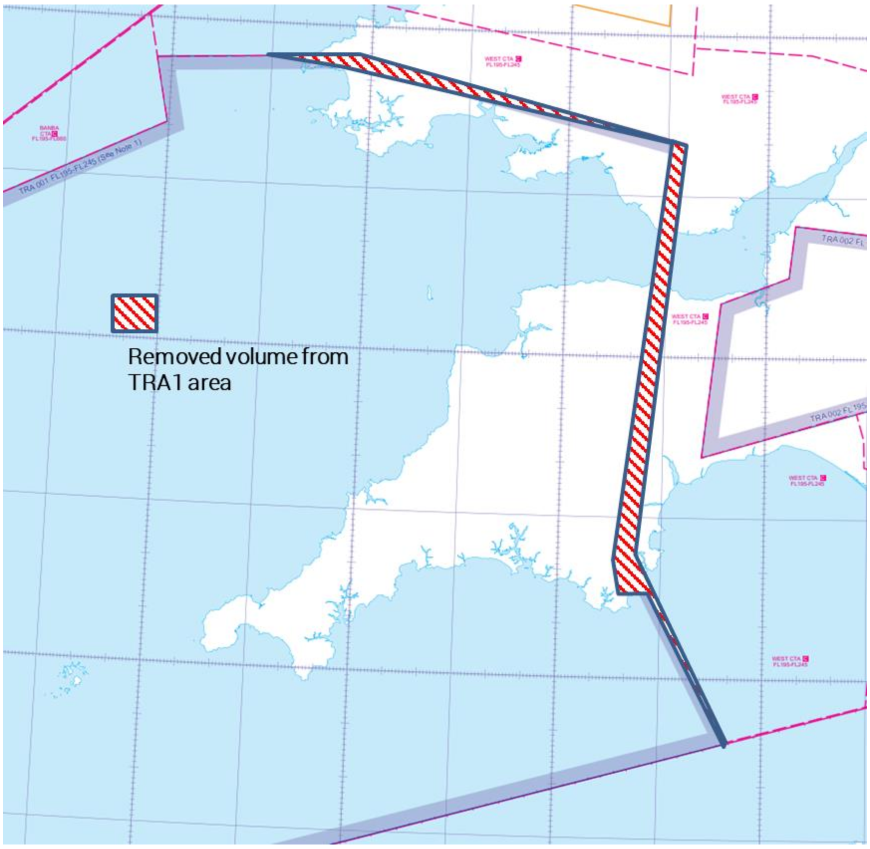


Figure 7 Proposed change to TRA001

5.4.11 The small lateral increase to Cotswold CTA 13 boundary reduces the TRA002 area by a minimal amount (approx. ~0.6NM) as shown in Figure 8.

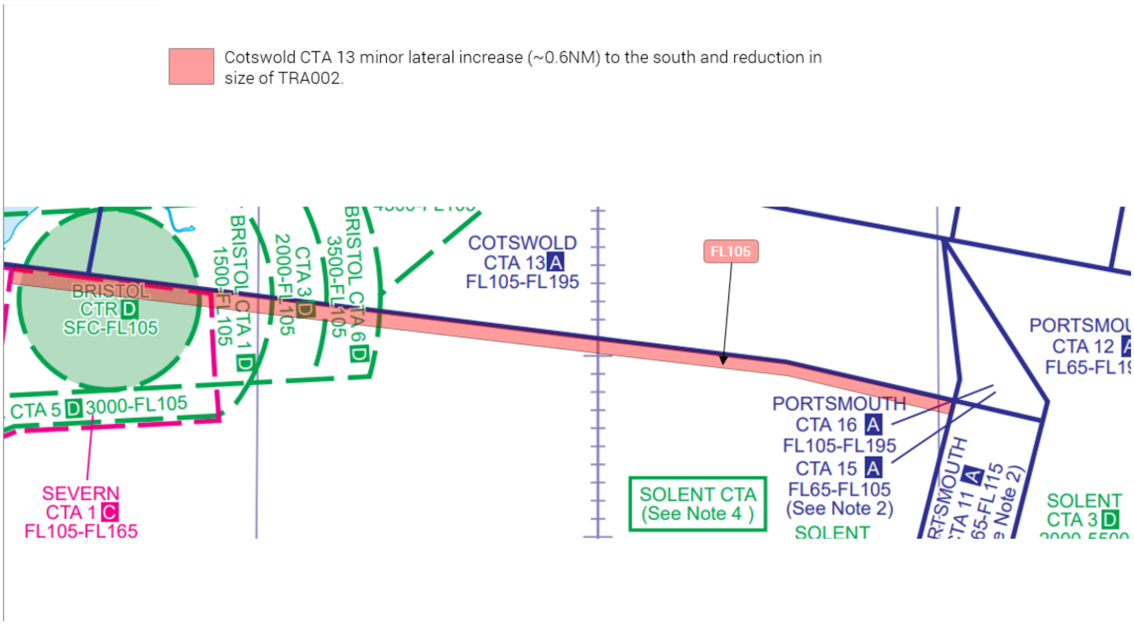


Figure 8 Proposed change to Cotswold CTA boundary and TRA002

5.5 Changes to holding

5.5.1 The current contingency hold (OKESI) used for Heathrow arrivals will be replaced, to align with the revised route structure. The holding pattern of the new hold will remain LEFT hand and hold limits remain as per current day.

5.5.2 Current contingency hold PLYMO is removed as it is redundant. Following assessment during the validation simulation, the MERLY hold is also being withdrawn. Figure 9 shows the current and proposed en-route holds.

Airfield Name	Current Hold Name	Turn Direction & Levels	Proposed Hold Name	Turn Direction & Levels	Summary of change/impact
London Heathrow	OKESI	LEFT FL160/FL240	OCTIZ	LEFT FL160/FL240	Replaced by new hold OCTIZ to align with route P2.
N/A	MERLY	RIGHT -	N/A	N/A	Withdrawn
N/A	PLYMO	LEFT	N/A	N/A	Withdrawn – redundant.

Table 8 Proposed amendments to contingency holds

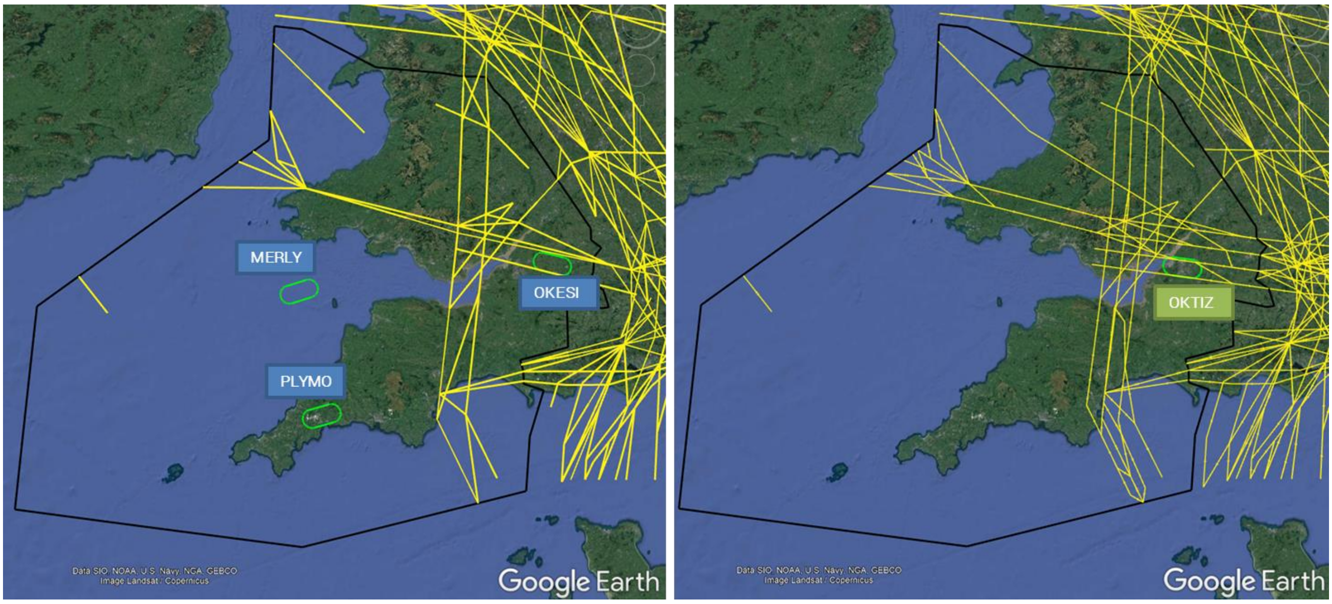


Figure 9 Current en -route holds in LD1.1 airspace (left) and proposed revised hold (right)

5.6 **Interface Details:**

5.6.1 The interfaces of LD1.1 with adjoining airspace structures are depicted in Figure 10 below and are described in full in this section. Additionally, the interface with the proposed overlying free route airspace (FRA) is also described, giving examples of typical flight profiles to/from example airports.

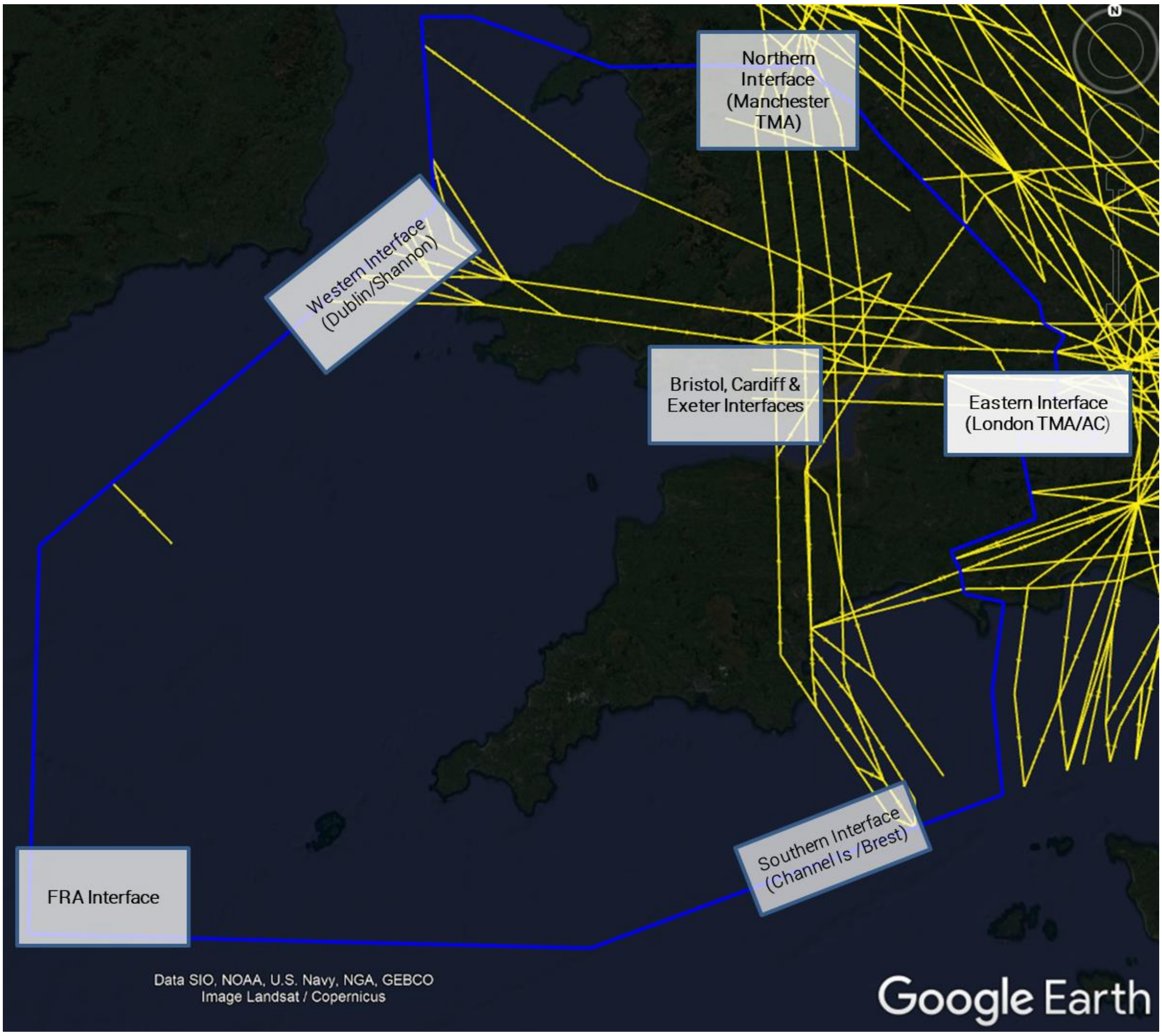


Figure 10: Overview of LD1.1 identifying interface areas

FRA interface: Arrivals

5.6.2 Each airport will have a defined set of arrival points (FRA Arrival points) for descending out of FRA to the lower ATS route structure, or to leave controlled airspace, to arrive at an airport[5].

5.6.3 As in today's operation, these routes may then link to Standard Terminal Arrival Routes (STARs) (where available) for the destination airport.

5.6.4 The FRA Arrival points would be used for flight planning to determine where aircraft would transition from FRA to the systemised route structure below. ATC will endeavour to ensure that actual descent profiles will not be impacted by the position of FRA Arrival points to account for aircraft performance and weather considerations.

5.6.5 The FASI airports within the FRA D2 footprint are Cardiff, Bristol and Exeter (only Cardiff and Bristol have STARs). Arrivals to airports outside of the FRA D2 area includes Manchester, Liverpool, Birmingham, London Heathrow, Gatwick and Luton among others.

5.6.6 The FRA arrival connecting points for all airports affected by the LD1.1 proposals are detailed in the draft AIP (Appendix 1). When FRA is deployed these will be published in the RAD Appendix 5.

5.6.7 Figure 11 shows an example of the proposed arrival structure at Cardiff Airport, described in Table 9.

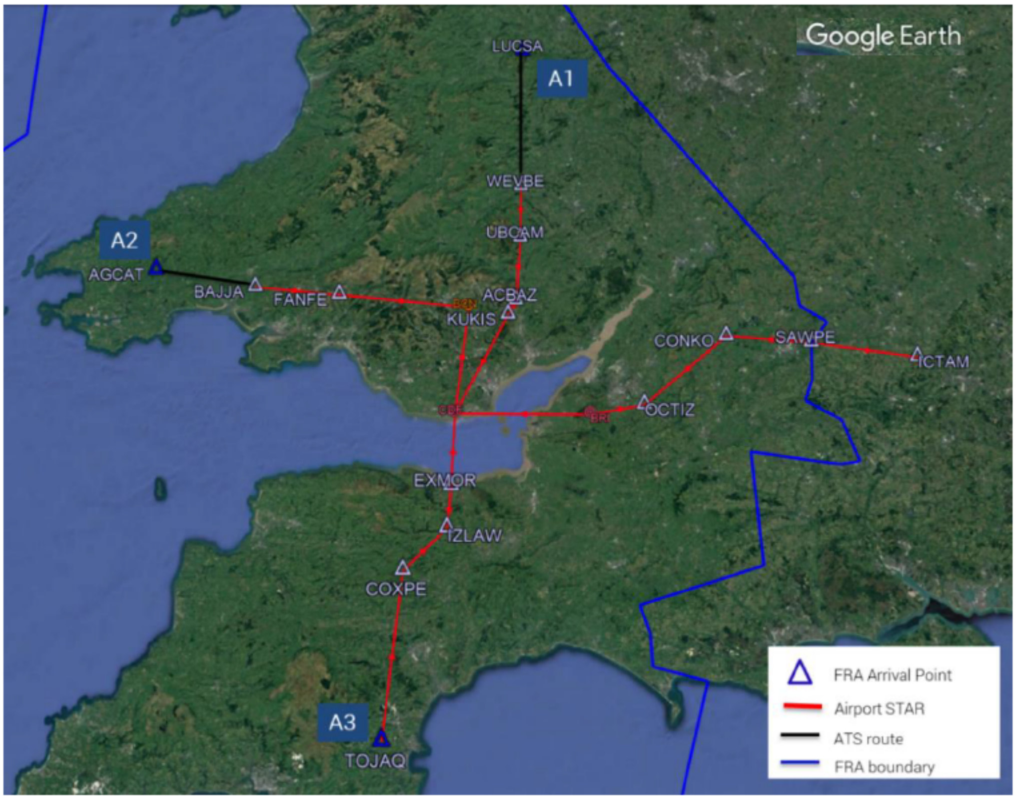


Figure 11 FRA interface: Proposed arrival structures (Cardiff Airport)

Airport	Direction	FRA Arrival Point	SRD	STAR	Remarks
EGFF	S bound (A1)	LUCSA	LUCSA – N862 WEVBE	WEVBE1C	
	E bound (A2)	AGCAT	BANBA DIQSE AGCAT Q63 BAJJA	BAJJA1C	
	N bound (A3)	TOJAQ	NOZHU SHIRI TOJAQ	TOJAQ1C	
	W bound		ICTAM	ICTAM1C	ICTAM outside of FRA so no FRA arrival point

Table 9 Examples of Arrival Connecting Points and links to lower ATS route structure – Cardiff Airport

[5] This is in accordance with EUROCONTROL FRA Guidance in ERNIP Part 1 Section 10 (Ref 11) which describes FRA arrival connectivity.

FRA Interface: Departures

5.6.8 Each airport will have a defined set of points for departures (FRA Departure points) to flight plan the transition (climb) from the lower ATS route structure into FRA. Where Standard Instrument Departures (SIDs) are available at the departure airport, connectivity between the SIDs and lower ATS routes is unchanged from today (or as described in Interface sections below).

5.6.9 Cardiff, Bristol and Exeter are the primary airports within the LD1.1 footprint (only Cardiff and Bristol have SIDs).

5.6.10 The FRA departure connecting points for all airports affected by the LD1.1 area are detailed in the draft AIP. When FRA is deployed these will be published in the RAD Appendix 5. See Appendix 1 for further details. In line with ERNIP guidance, they will also be published in the AIP (Ref 2).

5.6.11 Figure 12 shows an example of the proposed departure structure using Cardiff Airport:

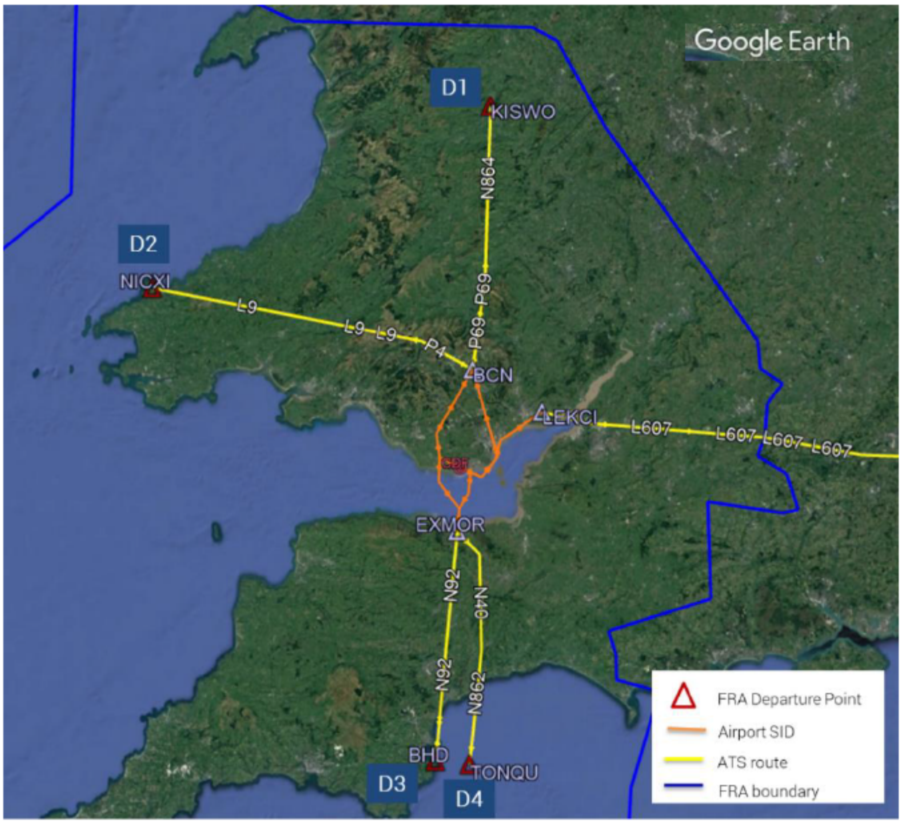


Figure 12 FRA interface: Proposed departure structures (Cardiff Airport)

Airport	Direction	FRA Departure Point	SRD	SID	Remarks
EGFF	N bound (D1)	KISWO	EGFF (BCN1A/1B) P69 DIZIM N864 KISWO	BCN	
	W bound (D2)	NICXI	EGFF (BCN 1A/1B) BCN P4 FELCA L9 NICXI	BCN	
	S bound (D3)	BHD	EGFF (EXMOR 1A/1B) EXMOR N92 DAWLY N864 BHD	EXMOR	COMPULSORY ROUTE WHEN N40 NOT AVAILABLE
	S bound (D4)	TONQU	EGFF (EXMOR 1A/1B) EXMOR N40 SIDHO N862 TONQU	EXMOR	COMPULSORY WHEN EXMOR N40 AVAILABLE
	E bound		EGFF (LEKCI 1A/1B) P4 HAWFA L607	LEKCI	No FRA departure point due to proximity of lateral FRA boundary with adjacent systemised airspace

Table 10 Examples of Departure Connecting Points and links to lower ATS route structure – Cardiff Airport

5.7 Airport interface: Bristol

5.7.1 Bristol Airport has been engaged with and involved in the development of the proposed interface with its arrival and departure procedures. Some amendments are required to current airport procedures to optimise connectivity to the network. Engagement and detailed design work with Bristol has ensured that the proposed LD1.1 network will allow Bristol's future design aspirations to be accommodated[6] (see Section 6 Impacts). Following consultation, some amendments to the Bristol airport connectivity have been made. This is fully described in the Stage 4A document (Ref 19). Additionally, some minor technical amendments have been made (waypoint/route renaming).

Arrivals

5.7.2 The changes to the enroute network require some realignment of the STARs into Bristol. This only affects the initial portion of the STARs and does not change any routes below 7,000ft.

5.7.3 From the north, the AMRAL 1B STAR and UMOLO 1B (contingency STAR for when RILES gliding area is active) will be re-aligned to connect to the new route structure.

5.7.4 From the east, the CPT 1B STAR will be extended back to abeam CPT to a new point ICTAM. This is a realignment of the current STAR. This reduces complexity in the CPT area.

5.7.5 From the west, a new RNAV1 STAR will be added connecting to the new route structure to start at new waypoint BAJJA. The extant RNAV5 FIFAH 1B STAR will remain unchanged for use only by RNAV5 traffic, with connectivity provided by DCT.

5.7.6 From the south, the extant DAWLY 1B STAR will be retained for RNAV5 traffic, via BHD. A new RNAV1 STAR (TOJAQ 1B) starting at new waypoint TOJAQ will provide connectivity for RNAV1 arrivals.

5.7.7 All STARs have been named in line with ICAO naming conventions, based on starting waypoint and the 'B' designator has been used to denote the destination airport (Bristol).

5.7.8 The proposed changes and network connectivity are described fully in the Draft AIP (Appendix 1) and summarised in Table 11 below. Figure 13 illustrates the current route connectivity and Figure 14 illustrates the proposed changes.

Current Procedure	Current route connectivity/STAR	Proposed route connectivity/STAR	Summary of Change / Impacts
AMRAL 1B STAR (RNAV5)	N862 - AMRAL RILES DOBEM INGUR BRI	N862 - WEVBE UBCAM INGUR BRI	Start segments re-aligned via new points WEVBE and UBCAM to connect to realigned route N862. **Rename WEVBE 1B**
UMOLO 1B STAR (RNAV5)	N864 - UMOLO TALGA BCN PEGZA BRI	N862 -RUMKE DCT ELREW DIZIM BCN PEGZA BRI	Start segments re-aligned via new points ELREW and DIZIM to connect via DCT to realigned route N862. **Rename ELREW 1B**
CPT 1B (RNAV5)	L9: CPT POMAX BRI	Q63: ICTAM SAWPE ASHUM POMAX BRI	Start point realigned to new point ICTAM to connect to realigned route Q63. **Rename ICTAM 1B**
	-	Q63: BAJJA FANFE BCN PEGZA BRI	New RNAV1 STAR, connectivity with realigned Q63. **BAJJA 1B**
FIFAH 1B (RNAV5)	Q63: FIFAH AMMAN BCN BRI	KAWGE DCT FIFAH BCN BRI	No change to STAR, connecting route realigned to DCT
DAWLY 1B (RNAV5)	N864: DAWLY EXMOR BRI	N864: DAWLY EXMOR BRI	No change
		FRA: TOJAQ COXPE IZLAW EXMOR BRI	New RNAV1 STAR **TOJAQ 1B**

Table 11 Bristol Airport Arrival procedures and connectivity - current and proposed

[6] Note: if any subsequent changes to the network are necessary to facilitate connectivity these could be progressed via the LD1.2 ACP.

Figure 13 Bristol Airport: Current arrival procedures and route connectivity

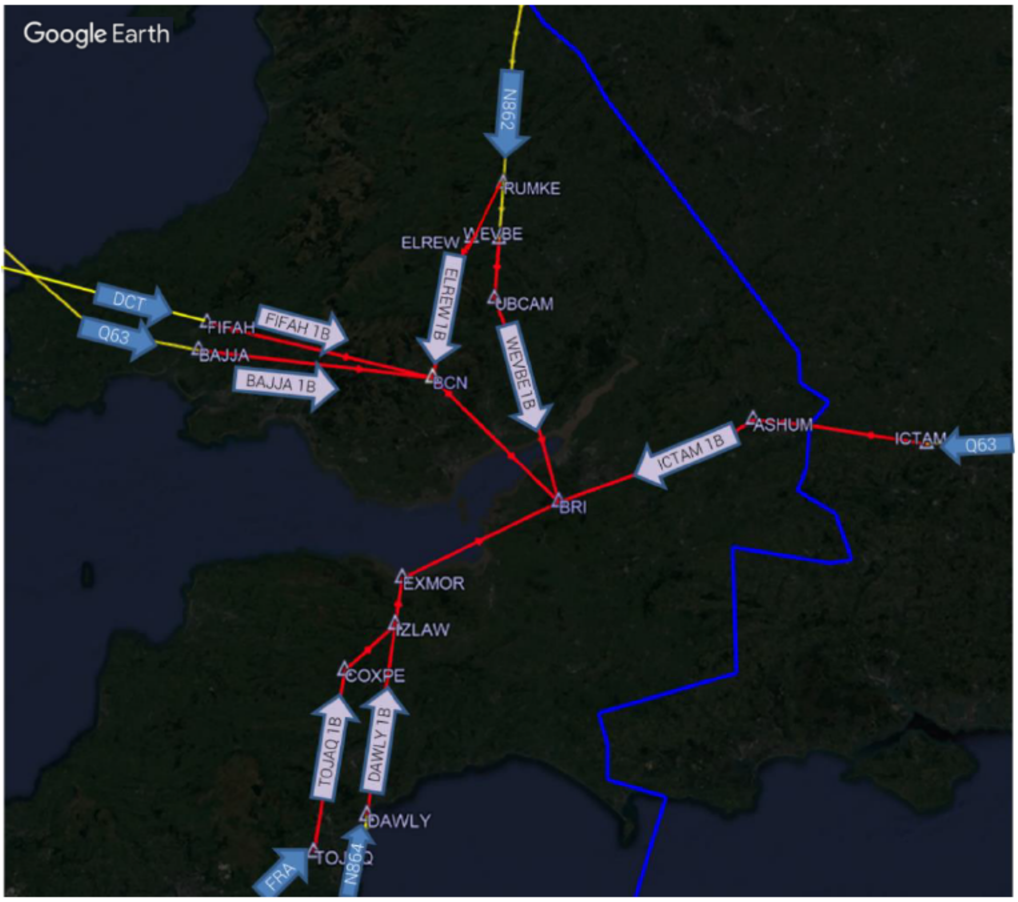


Figure 14 Bristol Airport: Proposed arrival procedures and route connectivity

Departures

5.7.9 The Bristol SIDs are listed in Table 12 below. Note that SIDs suffixed with 'Z' are departures using Runway 09 and those suffixed 'X' are departures using Runway 27. Two SID truncations are proposed to existing conventional SIDs in order to interface with the proposed enroute network.

5.7.10 Departures to the north will use the BCN SIDs to connect with the realigned N864 at DIZIM via new route P69.

5.7.11 Departures to the east will join the realigned L607 route via truncated SIDs HAWFA 1X and YORQI 1Z. The truncation points are coincident with where the extant BADIM1X/WOTAN1Z SIDs cross the realigned L607 route. Currently, aircraft flying the BADIM/WOTAM SIDs pass the proposed truncation point above FL80, and therefore the truncation of these SIDs will not change any flight profiles below 7,000ft.

5.7.12 Departures to the south will use the EXMOR SIDs. Route connectivity will be via new route N92 DAWLY to join N864. Weekend departures will route via new route N40.

5.7.13 Departures to the west will use the BCN SIDs to connect with the realigned L9 route at FELCA via new route P4.

5.7.14 Figure 15 and Figure 16 overleaf show the current and proposed departure procedures.

Current Procedure	Current route connectivity/SID	Proposed route connectivity/SID	Summary of Change / Impacts
BCN 1X (Conv)	BCN 1X (Rwy 27) BCN connect with Q63 w/bound, N864 n/bound	BCN 1X (Rwy 27), BCN, w/bound connect with L9 at FELCA via new route P4; n/bound connect with realigned N864 at DIZIM via new route P69	No change to SID, amended route connectivity
BCN 1Z (Conv)	BCN 1Z (Rwy 09), BCN connect with Q63 w/bound, N864 n/bound	BCN 1Z (Rwy 09), BCN, w/bound connect with realigned L9 at FELCA via new route P4; n/bound connect with realigned N864 at DIZIM via new route P69	No change to SID, amended route connectivity
BADIM 1X (Conv)	BADIM 1X (Rwy 27) BADIM, connect with Q63 e/bound	HAWFA 1X (Rwy 27), HAWFA, connect with realigned L607 e/bound	Truncation to HAWFA, connecting route re-aligned. **Rename HAWFA 1X**
WOTAN 1Z (Conv)	WOTAN 1Z (Rwy 09), WOTAN, connect with Q63 e/bound	YORQI 1Z (Rwy 09), YORQI, connect with realigned L607 e/bound	Truncation to YORQI, connecting route re-aligned. **Rename YORQI 1Z**
EXMOR 1X (Conv)	EXMOR 1X (Rwy 27) SOMOT, EXMOR, connect with N864 s/bound	EXMOR 1X (Rwy 27) SOMOT, EXMOR, connect with N92 or N40(weekend only) s/bound	No change to SID, amended route connectivity
EXMOR 1Z (Conv)	EXMOR 1Z (Rwy 09), SOMOT, EXMOR, connect with N864 s/bound	EXMOR 1Z (Rwy 09), SOMOT, EXMOR, connect with N92 or N40(weekend only) s/bound	No change to SID, amended route connectivity

Table 12 Bristol Airport Departure procedures and connectivity - current and proposed

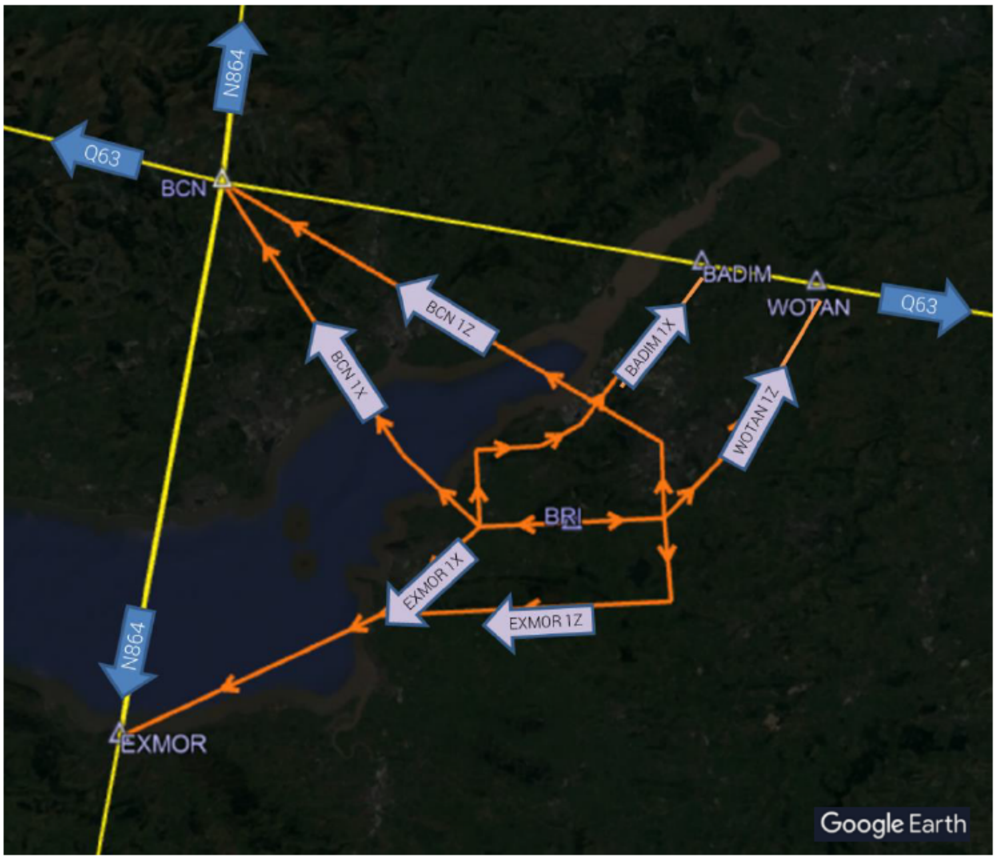


Figure 15 Bristol Airport: Current departure procedures and connectivity

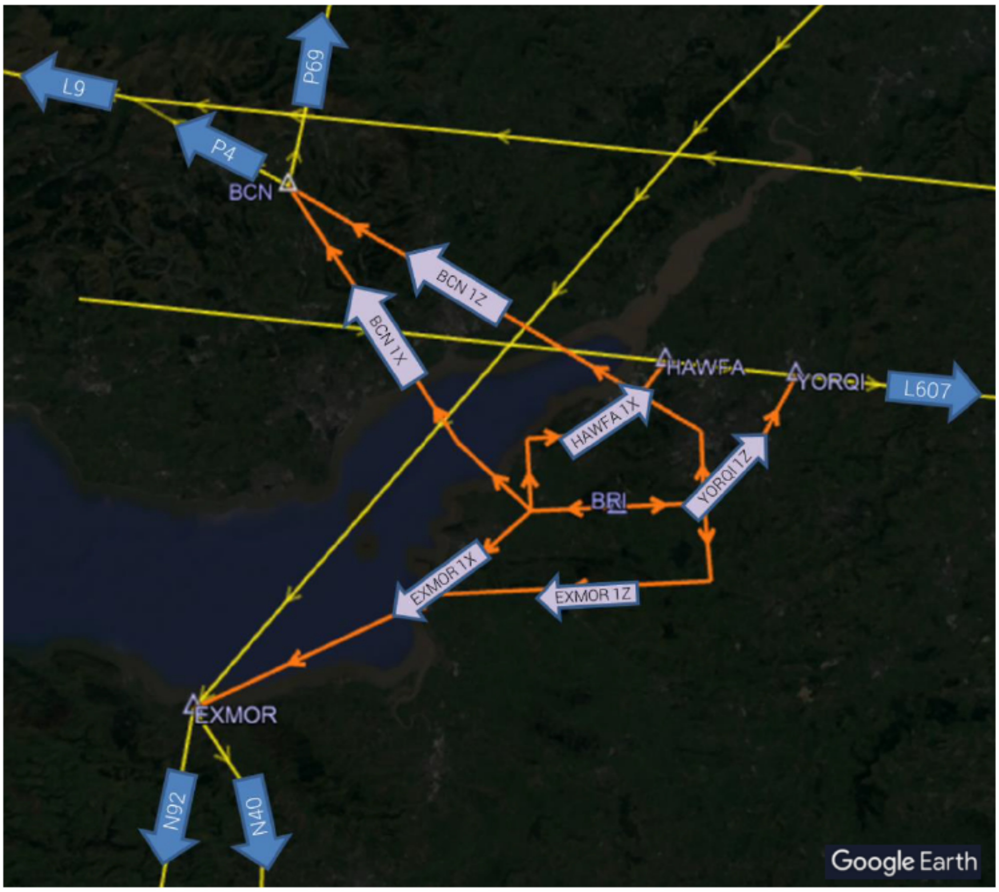


Figure 16 Bristol Airport: Proposed departure procedures and connectivity

5.8 Airport interface: Cardiff

5.8.1 Cardiff Airport has been engaged with and involved in the development of the proposed interface with its arrival and departure procedures. Some amendments are required to current airport procedures to optimise connectivity to the network. Engagement and detailed design work with Cardiff have ensured that the proposed LD1.1 network will allow Cardiff's future design aspirations to be accommodated[7] (see Section 6 Impacts). Following consultation, some amendments to the Cardiff airport connectivity have been made. This is fully described in the Stage 4A document (Ref 19). Additionally, some minor technical amendments have been made (waypoint/route renaming).

Arrivals

5.8.2 The changes to the enroute network require some realignment of the STARs into Cardiff. This only affects the initial portion of the STARs and does not change any routes below 7,000ft.

5.8.3 From the north, the AMRAL 1C STAR and UMOLO 1C (contingency STAR for when RILES gliding area is active) will be re-aligned to connect to the new route structure.

5.8.4 From the east, the CPT 1C STAR will be extended back to abeam CPT to a new point ICTAM. This is a realignment of the current STAR. This reduces complexity in the CPT area.

5.8.5 From the west, a new RNAV1 STAR will be added connecting to the new route structure to start at BAJJA. The extant RNAV5 FIFAH 1C STAR will remain unchanged for use only by RNAV5 traffic, with connectivity provided by DCT.

5.8.6 From the south, the extant DAWLY 1C STAR will be retained for RNAV5 traffic, via BHD. A new RNAV1 STAR (TOJAQ 1C) starting at new waypoint TOJAQ will provide connectivity for RNAV1 arrivals.

5.8.7 All STARs will be named in line with ICAO naming conventions, based on starting waypoint and the 'C' designator has been used to denote the destination airport (Cardiff).

5.8.8 The proposed changes and network connectivity are described fully in the Draft AIP (Appendix 1) and summarised in Table 13 below. Figure 17 shows the current connectivity and Figure 18 shows the proposed changes.

Current Procedure	Current route connectivity/STAR	Proposed route connectivity/STAR	Summary of Change / Impacts
AMRAL 1C STAR (RNAV5)	N862: AMRAL RILES DOBEM KUKIS CDF	N862 - WEVBE UBCAM ACBAZ KUKIS CDF	Start segments re-aligned via new points WEVBE and UBCAM to connect to realigned route N862. **Rename WEVBE 1C**
UMOLO 1C STAR (RNAV5)	N864 - UMOLO TALGA BCN CDF	N862 -RUMKE DCT ELREW DIZIM BCN CDF	Start segments re-aligned via new points ELREW and DIZIM to connect via DCT to realigned route N862. **Rename ELREW 1C**
CPT 1C (RNAV5)	L9: CPT POMAX BRI	Q63: ICTAM SAWPE CONKO OCTIZ CDF.	Start point realigned to new point ICTAM to connect to realigned route Q63. **Rename ICTAM 1C**
	-	Q63: BAJJA FANFE BCN CDF	New RNAV1 STAR, connectivity with realigned Q63 **BAJJA 1C**
FIFAH 1C (RNAV5)	Q63: FIFAH AMMAN BCN CDF	KAWGE DCT FIFAH BCN CDF	No change to STAR, connecting route realigned to DCT
DAWLY 1C (RNAV5)	N864: DAWLY IZLAW EXMOR CDF	N864: DAWLY IZLAW EXMOR CDF	No change
		FRA: TOJAQ COXPE IZLAW EXMOR CDF	New RNAV1 STAR **TOJAQ 1C**

Table 13 Cardiff Airport arrival procedures and connectivity - current and proposed

[7] Note: if any subsequent changes to the network are necessary to facilitate connectivity these could be progressed via the LD1.2 ACP.

Figure 17 Cardiff Airport: Current arrival procedures and route connectivity

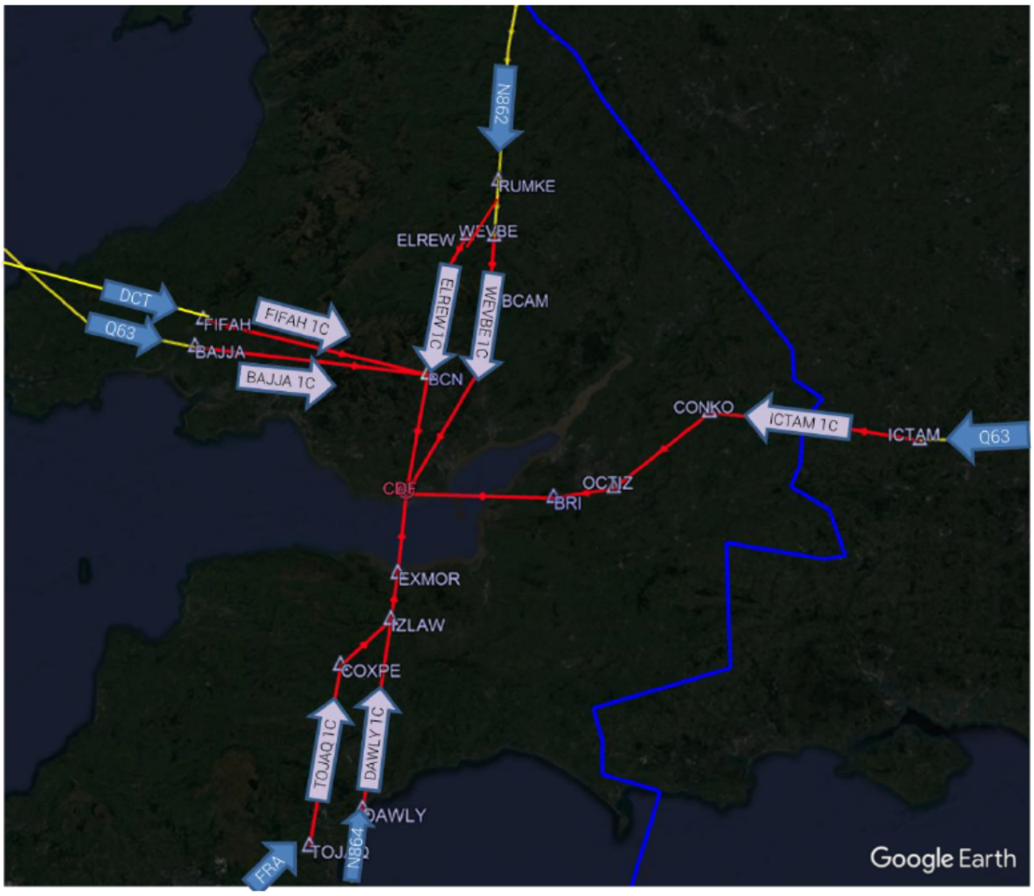


Figure 18 Cardiff Airport: Proposed arrival procedures and route connectivity

Departures

5.8.9 The Cardiff SIDs are listed in Table 14 below. Note that SIDs suffixed with 'A' are departures using Runway 30 and those suffixed 'B' are departures using Runway 12. There are no changes to the BCN and EXMOR SIDS from Cardiff. From the SID end points there is improved connectivity to the enroute network. One SID truncation is proposed to existing conventional SID (ALVIN 1B) in order to interface with the proposed enroute network.

5.8.10 Departures to the north will use the BCN SIDs to connect with the realigned N864 at DIZIM via new route P69.

5.8.11 Departures to the east will join the realigned L607 route via truncated SID LEKCI 1A. The truncation point (LEKCI) is north of L607 hence a link route (P4) connects the SID to L607 at HAWFA. Currently, aircraft flying the ALVIN 1B SID pass the proposed truncation point at between FL120-FL140, hence it is clear that truncation of this SID will not change any flight profiles below 7,000ft. Currently most eastbound aircraft are vectored off the SID (which keeps them over the Severn Estuary).

5.8.12 Departures to the south will use the EXMOR SIDs. Route connectivity will be via new route N92 DAWLY to join N864. Weekend departures will route via new route N40.

5.8.13 Departures to the west will use the BCN SIDs to connect with the realigned L9 route at FELCA via new route P4.

5.8.14 Figure 19 and Figure 20 overleaf show the current and proposed departure procedures.

Current Procedure	Current route connectivity/SID	Proposed route connectivity/SID	Summary of Change / Impacts
BCN 1A SID (Conv)	BCN 1A (Rwy 30), BCN connect with Q63 w/bound, N864 n/bound	BCN 1A (Rwy 30), with realigned L9 at FELCA via new route P4; n/bound connect with realigned N864 at DIZIM via new route P69	No change to SID, amended route connectivity
BCN 1B SID (Conv)	BCN 1B (Rwy 12), east, BCN connect with Q63 w/bound, N864 n/bound	BCN 1B (Rwy 12), BCN, w/bound connect with realigned L9 at FELCA via new route P4; n/bound connect with realigned N864 at DIZIM via new route P69	No change to SID, amended route connectivity
ALVIN 1B (RNAV1)	ALVIN 1B (Rwy 12), ALVIN, connect with Q63 eastbound	LEKCI 1A (Rwy 12), LEKCI - P4 to connect with realigned L607 e/bound at HAWFA	Truncation to LEKCI, connecting route re-aligned. **Rename LEKCI 1A**
EXMOR 1A (Conv)	EXMOR 1A (Rwy 30), EXMOR, connect with N864 s/bound	EXMOR 1A (Rwy 30), EXMOR, connect with N92 or N40(weekend only) s/bound	No change to SID, amended route connectivity
EXMOR 1B (Conv)	EXMOR 1B (Rwy 12), east, EXMOR, connect with N864 s/bound	EXMOR 1B (Rwy 12), EXMOR, connect with N92 or N40(weekend only) s/bound	No change to SID, amended route connectivity

Table 14 Cardiff Airport departure procedures and connectivity - current and proposed

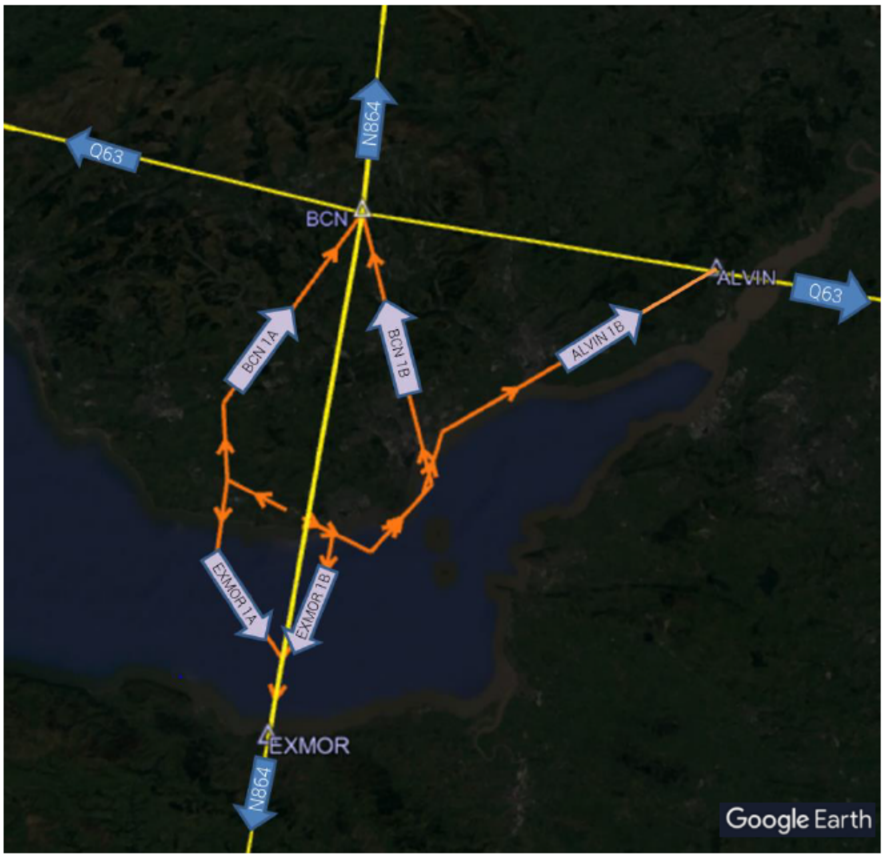


Figure 19 Cardiff Airport: Current departure procedures and connectivity

Figure 20 Cardiff Airport: Proposed departure procedures and connectivity

5.9 Airport interface: Exeter

5.9.1 Exeter Airport has been engaged with and involved in the development of the proposed interface with its arrival and departure procedures. Engagement and detailed design work with Exeter have ensured that the proposed LD1.1 network will allow Exeter's future design aspirations to be accommodated[8] (see Section 6 Impacts). There were no changes to the design as a result of consultation.

5.9.2 As Exeter is outside CAS, traffic would continue to join/leave at the same positions as today, EXMOR, BHD, GIBSO/SAM. Therefore, there is no change proposed to the Exeter operations.

5.9.3 Figure 21 shows the current and proposed ATS route structure in the vicinity of Exeter Airport, with the main connection points to the ATS route network of EXMOR, GIBSO and BHD (Berry Head) identified.

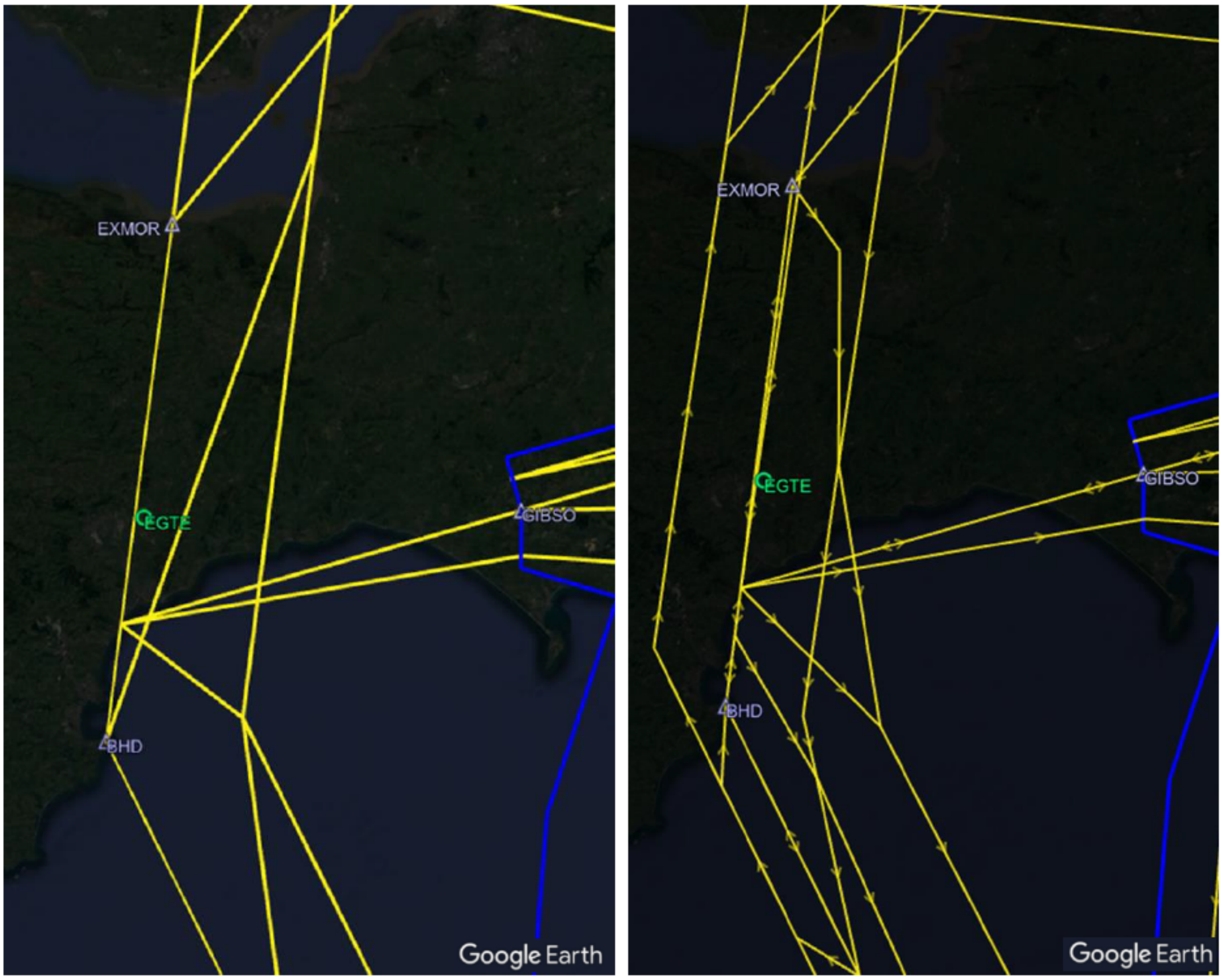


Figure 21 Current ATS route structure in the vicinity of Exeter Airport (left) and proposed route structure (right)

5.9.4 The changes in this proposal will result in no change to Exeter arrival and departure flight profiles. Exeter traffic would benefit from the network improvements in the en-route phase of flight.

[8] Note: if any subsequent changes to the network are necessary to facilitate connectivity these could be progressed via the LD1.2 ACP.

5.10 Eastern Interface (LTMA/LUS/LMS)

5.10.1 This section describes the LD1.1 interface with airports and airspace to the east, in particular those airports in the London Terminal Manoeuvring Area (LTMA) and the interface with the adjoining London Middle Sector (LMS) and London Upper Sector (LUS) airspace.

5.10.2 Currently traffic is not systemised by route in this airspace. Most routes diverge and converge at various points eg. P2 from L607, UL9 and L18, and numerous routes in the Compton (CPT) area.

5.10.3 Where the LD1.1 airspace links with today's London Terminal Manoeuvring Area (LTMA) and London Area Control (LAC) legacy airspace in the vicinity of the CPT VOR, it is proposed that there would be four main east/west routes, expanding to five routes at BIBPE, as well as a number of link routes. Figure 22 shows the current route structure at the eastern interface, and Figure 23 shows the proposed route structure and connectivity to legacy routes.

5.10.4 The proposed systemised flow of traffic would be westerly for the three northern routes (N14, L9, Q63) within the region of the LTMA interface, and easterly for the two southern routes (L607, P2). Note. Between DIDZA and BIBPE, L9 and N14 are dual-designated.

5.10.5 Traffic flows from several airports would be subject to small changes at this interface, and the route connectivity with airport procedures would require the start points of some STARs to be modified. Figure 23 to Figure 27 and Table 15 to Table 16 detail the proposed changes to SIDs & STARs for the affected airports. These figures show the current and proposed STARs & SIDs and show where route connectivity with airport procedures is required to be amended.

5.10.6 All LTMA departures with an RFL above FL195 would utilise the northern routes L9 or N14 westbound.

5.10.7 Traffic with an RFL below FL195 would use Q63 westbound. All LTMA arrivals would utilise P2 to join STARs at SIRIC.

5.10.8 EGLF and Solent arrivals and Severn Group & Brize Group departures would utilise L607.

5.10.9 The proposed design provides a greater degree of systemisation of the routes compared to today's operation. This will reduce the density of conflicting routes in the region of CPT to enable more traffic to be retained on their flight planned routes, reducing workload associated with tactical intervention by Controllers (see para 3.3.1).

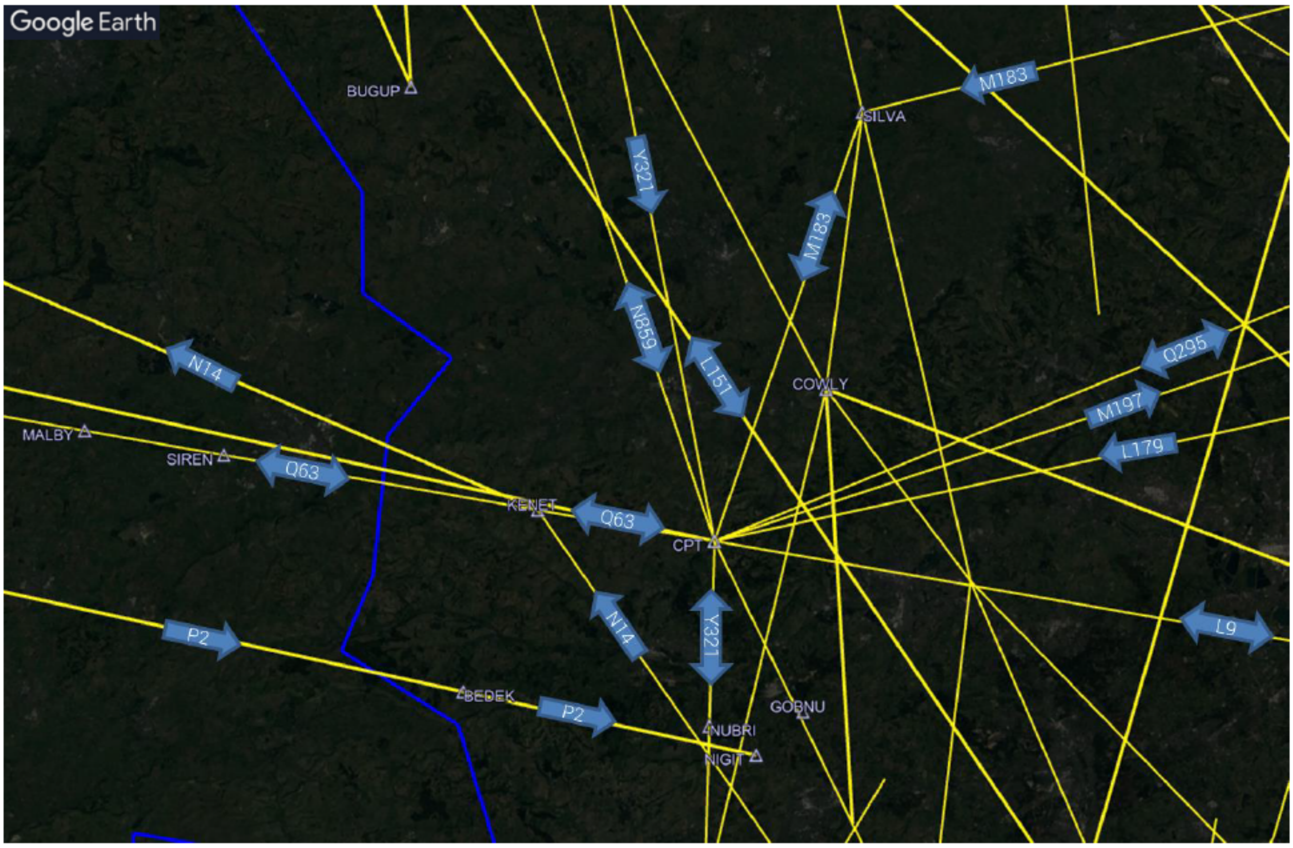


Figure 22 Extant route structure at eastern interface (LTMA/LMS/LUS interface)

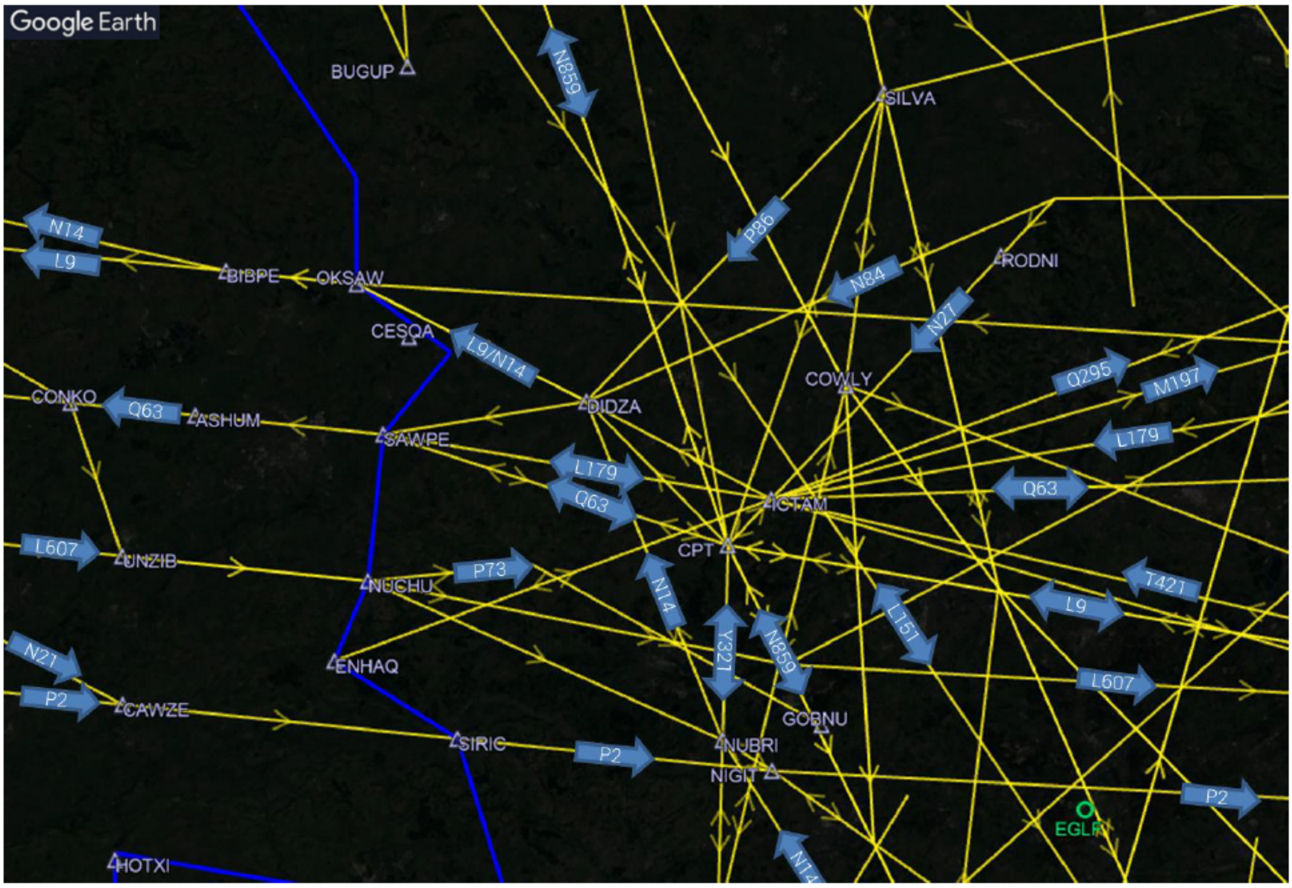


Figure 23 Proposed route structure at eastern interface (LTMA/LMS/LUS interface)

Proposed changes to Airport STARs at Eastern Interface

5.10.10 Table 15 below details the proposed amendments to STARs with the airports at the east interface.

5.10.11 Where nomenclature changes have been made since consultation these are described in the 4A Update Design document (Ref 19).

Arrivals

5.10.12 LTMA arrivals from the West: Currently use ATS route P2 and join STARs at BEDEK. These STARs serve EGLL/EGWU (BEDEK 1H), EGGW (BEDEK 1N), EGSS/EGSC (BEDEK 1L), EGLC/EGKB (BEDEK 1C) and EGKK (BEDEK 1G). Figure 24 shows the current arrival connectivity for the BEDEK STARs.

5.10.13 The systemised route structure will see EGLL/EGKK traffic arrive on the realigned P2 (Route E). All other traffic will arrive on realigned L607 (Route D) to YORQI where it joins P2 at CAWZE via N21.

5.10.14 To optimise connectivity with the systemised route structure it is proposed to realign these BEDEK STARs to a new starting point on P2, SIRIC (2.5nm south of BEDEK). Aircraft typically join these STARs at FL170/180. This has a negligible track mileage difference (an increase of <0.5nm). Figure 25 shows the proposed arrival connectivity for the revised SIRIC STARs.

5.10.15 EGGW Arrivals: This STAR is being amended to remove MOREZ. This straightens the STAR, reducing track mileage by approx. 9nm, providing fuel and CO_2e benefit for Luton Arrivals. Traffic is typically @FL160 between these points.

5.10.16 EGSS Arrivals: The SIRIC 1L STAR is being revised to remove OCK. This straightens the STAR, reducing track mileage by approx. 3.6nm, enabling fuel and CO_2e benefits for Stansted arrivals

5.10.17 EGHH/HI arrivals from the west: Currently via Q63 to CPT 1S STAR at CPT. This traffic will now route via L18 (eastbound route) to connect with the extant BUGUP 1S STAR at NUBRI. This offers reduced track mileage of approximately 8NM to route NUCHU-NUBRI.

5.10.18 EGLF arrivals using the CPT 1V STAR. This STAR will remain via CPT for traffic arriving from the east (via L179/Q63) and traffic arriving from the north on N859. Traffic arriving from the west, currently on Q63, would join from L607 to NUCHU. A new connecting route P73 will connect to CPT 1V at GOBNU. This routing provides a better profile for arrivals descending into EGLF, and aids deconfliction with departing traffic from LTMA airports. See Figure 26 which shows the current and proposed connectivity to the arrival procedures.

Airport	STARs	Current route connectivity/STAR	Proposed route connectivity/STAR	Summary of Change / Impacts
EGLL[9]	BEDEK 1H (EGLL)	P2: BEDEK NIGIT LLW03 OCK	P2: SIRIC NIGIT LLW03 OCK	Re-alignment of start point from BEDEK to SIRIC renamed SIRIC 1H. No change after NIGIT, no change below FL100
EGLL Stack swap	BEDEK 1Z (EGLL)	ATC: BEDEK CPT BNN	ATC: SIRIC CPT BNN	Re-alignment of start point from BEDEK to SIRIC, renamed SIRIC 1Z. No change after CPT, no change below FL100
EGKK:	BEDEK 1G	P2: BEDEK NIGIT MID TUFOZ HOLLY WILLO	P2: SIRIC NIGIT MID TUFOZ HOLLY WILLO	Re-alignment of start point from BEDEK to SIRIC, renamed SIRIC 1G. No change after NIGIT, no change below FL100
EGLC[10]	BEDEK 1C	P2: BEDEK BIG UMTUM GODLU	P2: SIRIC BIG UMTUM GODLU	Re-alignment of start point from BEDEK to SIRIC, renamed SIRIC 1C. No change after BIG, no change below FL160
EGGW:	BEDEK 1N	P2: BEDEK NIGIT MOREZ VATON OZZOT BPK ILLOC OXDUF COCCU JUMZI ZAGZO	P2: SIRIC NIGIT VATON OZZOT BPK ILLOC OXDUF COCCU JUMZI ZAGZO	Realignment of start point from BEDEK to SIRIC, renamed SIRIC 1N. MOREZ removed from STAR. No change after VATON, no change below FL150
EGSS[11]:	BEDEK 1L	P2: BEDEK – NIGIT - OCK - VATON - BPK - BKY - BUSTA - LOREL	P2: SIRIC NIGIT VATON BPK BKY BUSTA LOREL	Realignment of start point from BEDEK to SIRIC, renamed SIRIC 1L. OCK removed from STAR. No change after VATON, no change below FL150
EGHI	CPT 1S	Q63: CPT – PEPIS - SAM	L18: NUBRI – PEPIS – SAM (BUGUP 1S)	No change to STAR. Traffic to now utilise BUGUP 1S. Repositioned flights above FL100. Reduces track mileage and improves fuel/CO_2e benefits
EGHH	CPT 1S	Q63: CPT – PEPIS - SAM	L18: NUBRI – PEPIS – SAM (BUGUP 1S)	No change to STAR. Traffic to now utilise BUGUP 1S. Repositioned flights above FL100. Reduces track mileage and improves fuel/CO_2e benefits
EGLF[12]	CPT 1V	Q63, N859, L179: CPT – GOBNU – INDOX – DIXIB – LFS02 – VEXUB	From north: via N859 no change From east L179: ICTAM Q63 CPT From the west: L607: NUCHU P73 REFKI GOBNU	No change to CPT 1V STAR. Revised connectivity from ATS route network to STAR. Traffic from west to join STAR at GOBNU via P73, reducing track mileage
EGLF	CPT 1P (RNAV5)	Q63, N859, L179: CPT – HANKY – PEPIS	From west: L607 NUCHU DCT CPT From north: N869/Y321 From east: ICTAM Q63 CPT STAR: CPT HANKY PEPIS	No change to CPT 1P STAR Revised connectivity from proposed ATS route network to STAR
EGVN	N/A (vectored)	Vectored from SIREN on Q63 to EGVN	Vectored from ASHUM on Q63 to EGVN	Movement of arrival point north by circa 1.6NM

Table 15 Eastern interface, proposed amendments to STARs / connectivity

[9] STARs for Heathrow (EGLL) are also used for Northolt (EGWU) and Denham (EGLD).

[10] STARs for London City (EGLC) are also used for Biggin Hill (EGKB)

[11] STARs for Stansted (EGSS) are also used for Cambridge (EGSC).

[12] STARs for Farnborough (EGLF) are also used for Blackbushe (EGLK), Dunsfold (EGTD), Fairoaks (EGTF), Lasham (EGHL), Odiham (EGVO).

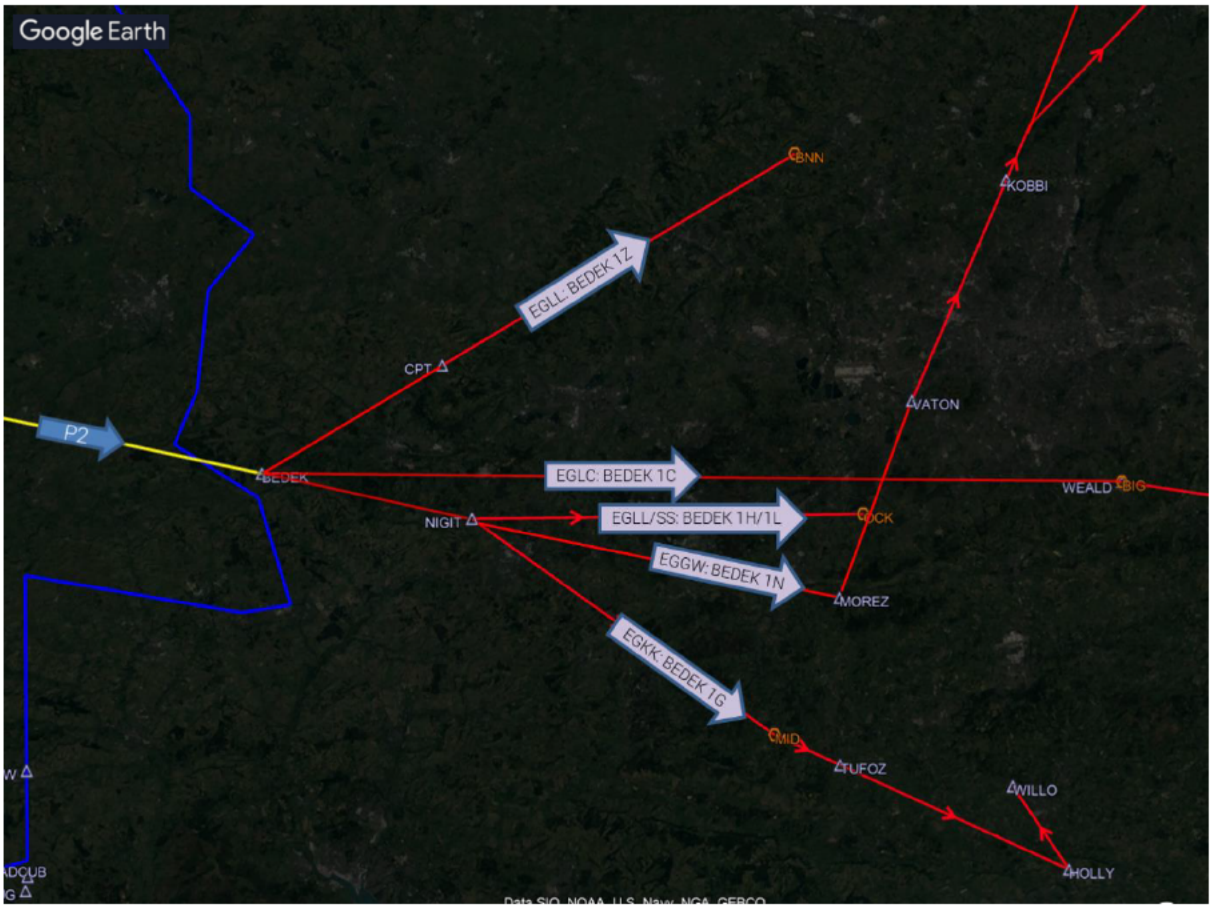


Figure 24 Current arrival connectivity for LTMA BEDEK STARs (EGLL, EGLC, EGKK, EGGW, EGSS)

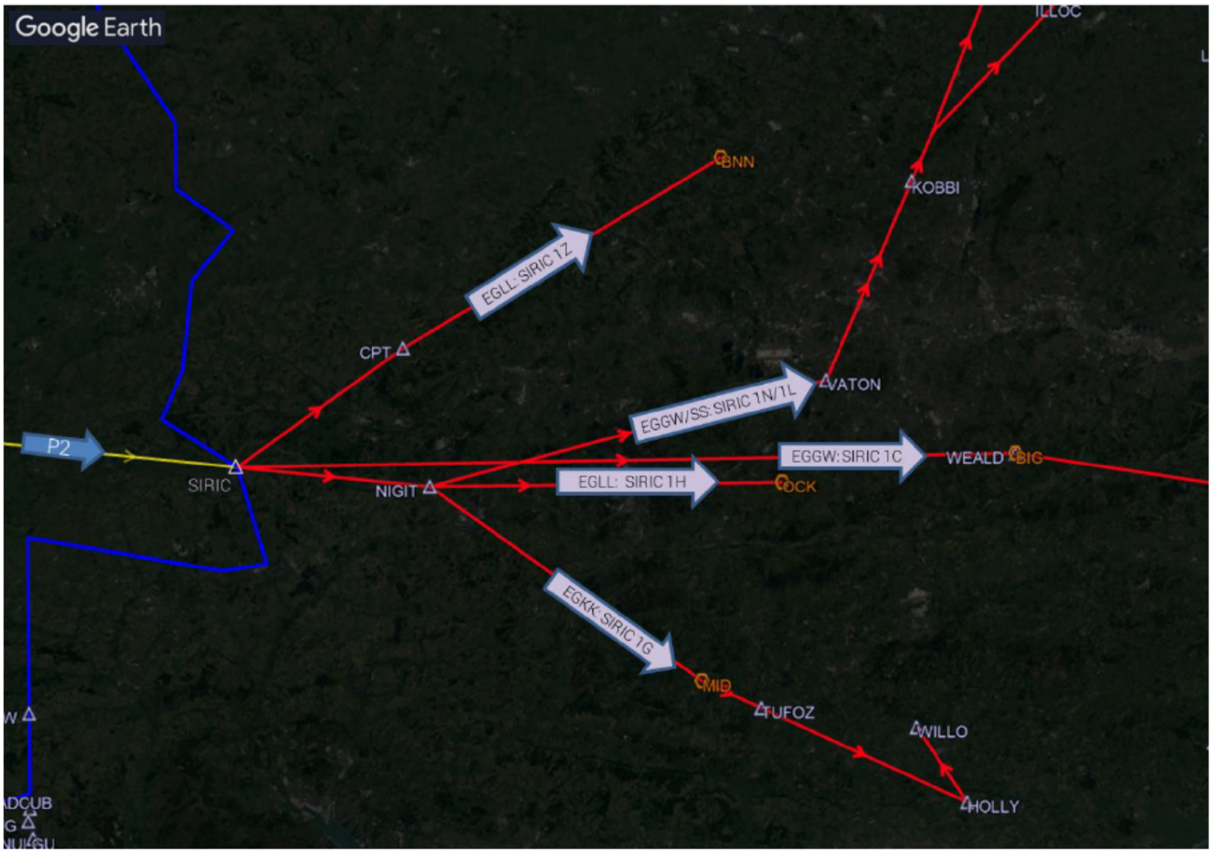


Figure 25 Proposed arrival connectivity for revised LTMA SIRIC STARs (EGLL, EGLC, EGKK, EGGW, EGSS)

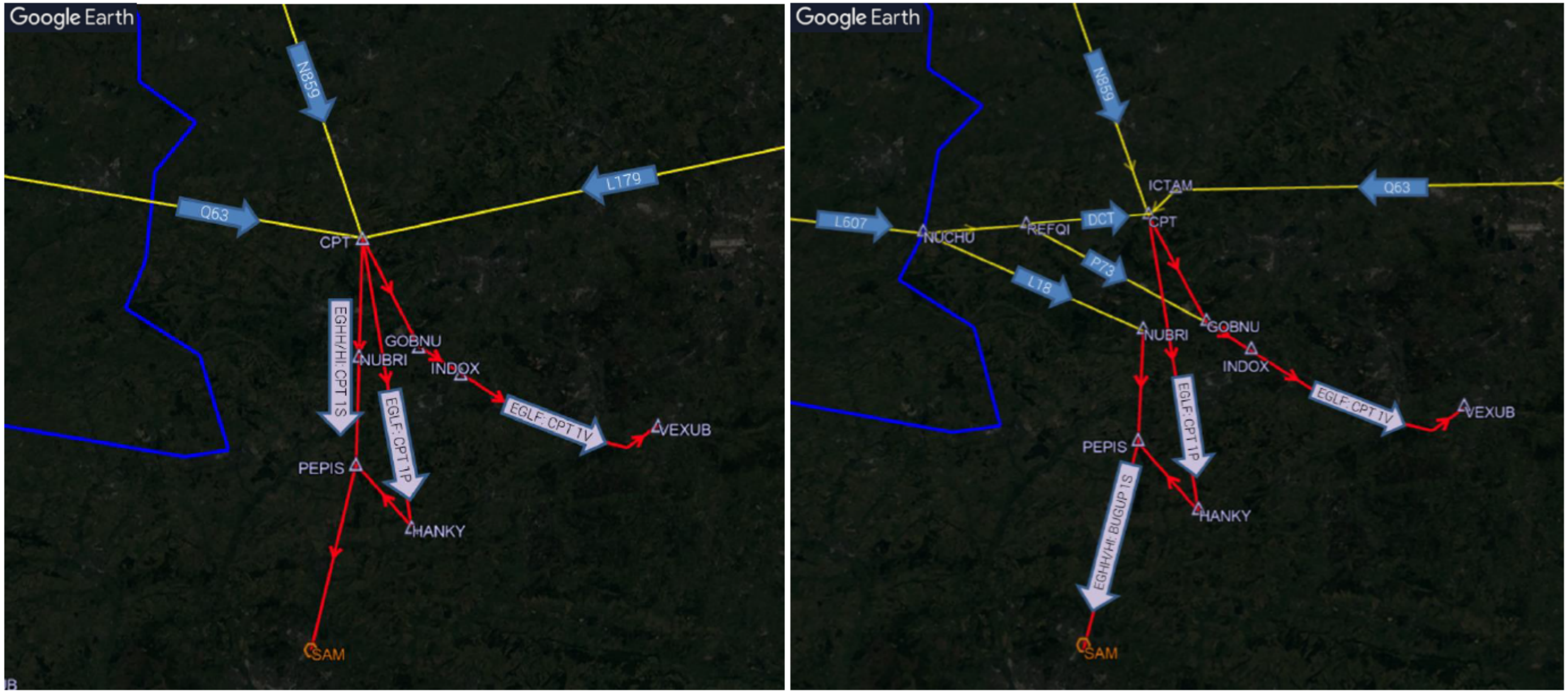


Figure 26 Current arrival connectivity and procedures for EGLF, EGHH, EGHI airports (left) and proposed arrival connectivity and procedures (right)

Proposed changes to Airport SIDs at Eastern Interface

5.10.19 Currently there are SIDs from Heathrow (EGLL), Luton (EGGW), and London City (EGLC) airports which carry westbound traffic to CPT and connect with westbound ATS route Q63.

5.10.20 EGLL: The EGLL CPT SIDs are unchanged. Departures using EGLL CPT will join the systemised route structure via CPT, connecting to L9/N14 at OKSAW (CPT DIDZA OKSAW). There would be no change to Heathrow departure flight profiles below 7000ft. Traffic passes CPT at FL100-FL140 so all changed profiles are above these levels.

5.10.21 EGGW: The CPT 4B & 7C SIDs for departures to the west, would be truncated from CPT to RODNI to enable the most efficient connectivity to the revised route network, and connect to L9/Q63 (via RODNI N27 ICTAM T421 DIDZA N14 BIBPE). Currently, aircraft flying the CPT 4B & 7C SIDs pass RODNI at between FL120-FL140; truncation of this SID will not change any flight profiles below 7,000ft. See Figure 27 for current and proposed routings.

5.10.22 Southbound traffic from EGGW through CPT currently connects to Y321/N859. This is outside the scope of this ACP and would remain unchanged.

5.10.23 EGLC: Under a separate ACP (OSEP Deployment 5 (Ref 6)) these CPT SIDs are proposed to be truncated to new point SAXBI. As these are planned to be implemented in September 2022, the route connectivity for LD1.1 will connect to these proposed SIDs SAXBI 1A & SAXBI 1H. The new routeing for EGLC departures provides reduced track mileage of ~8NM and additional enabled fuel benefits to airlines; traffic will be in the region of FL150+ in the HEN area[13].

5.10.24 EGKB: Departures currently route via CPT to route N14 via UL9. Traffic will continue to join N14, with a realigned routing via ICTAM rather than CPT, which improves systemisation.

5.10.25 EGSS: Westbound traffic from EGSS currently routes via the NUGBO SIDs onto M183 to CPT to connect with westbound UL9. Traffic will now leave M183 at SILVA, join new ATS Route P86 which connects SILVA to DIDZA. The current average flight level of aircraft at SILVA is FL220, so this proposed realignment would have no impact on tracks over the ground at lower levels (below FL100). Traffic would join L9 at OKSAW via DIDZA. No change to SIDs is proposed. This improves systemisation, reduces track mileage and helps to deconflict traffic in the CPT area.

5.10.26 EGKK: SIDs for Westbound traffic (RNAV5 only) depart via KENET. This conventional SID would be retained for RNAV5 traffic capped at FL165 or below. This would connect to realigned Q63 at SAWPE via DCT from KENET.

5.10.27 EGKK: Westbound RNAV1 traffic connects to ATS route N14, which traverses the LD1 airspace. N14 will be realigned from VOUGA – KENET to route VOUGA – DIDZA, to connect with L9/N14 via DIDZA-OKSAW. This would affect EGKK departures on the IMVUR and NOMVA SIDs which connect to N14 at NIBDA/VOUGA.

5.10.28 EGLF: Westbound traffic departs via HAZEL to join extant N14. There are no changes to this SID. EGLF traffic will now utilise the realigned Q63; route connectivity beyond NUBRI is revised to the new network.

5.10.29 EGHI/HH: Westbound departures currently route via the extant N14. Traffic will now route via the realigned Q63; route connectivity is revised accordingly.

5.10.30 EGVN: Departures are currently vectored to join Q63 via MALBY. As Q63 is being realigned, joining waypoint is now CONKO, on the re-aligned Q63, approx. 1.5nm north. This will not change tracks for arrival/departure procedures from Brize Norton below 7000ft.

5.10.31 Route/SID connectivity is detailed in Table 16 below and the extant/proposed routes shown in Figure 27. Engagement with all airports described has been conducted throughout the ACP process. See Section 6 Impacts.

[13] This creates a dependency between these ACPs.

Airport	SIDs	Current route connectivity	Proposed route connectivity	Summary of Change / Impacts
EGLL	CPT 3F, 3G, 5J, 4K	Q63 via CPT –	CPT: L9, N14 via L9 DIDZA	No change to SIDs. Connectivity to L9/N14
EGGW	CPT 4B, 7C	Q63, Y321, N859 via CPT	West: L9 via RODNI N27 ICTAM T421 DIDZA N14 OKSAW RNAV5 traffic: Q63 via RODNI N27 ICTAM L179 SAWPE South: Y321 via ICTAM Q63 CPT	Truncation of EGGW CPT SID (from CPT truncated to RODNI) Enables traffic to route RODNI ICTAM DIDZA rather than routeing all the way to CPT resulting in ~ 3NM track saving per flight
EGLC	CPT 1A/1H	Q63 via CPT	L9: SAXBI N27 HEN N84 DIDZA OKSAW Q63: SAXBI N27 HEN N84 DIDZA P86 SAWPE	EGLC SIDs truncated to new point SAXBI in OSEP Deployment 5 in September 2022 (proposed)
EGKB	N/A	CPT UL9 KENET N14	BPK DCT SAXBI N27 ICTAM T421 DIDZA N14 OKSAW	N/A as no SID at EGKB, flights will route via ICTAM resulting in ~ 3NM track saving per flight
EGSS	NUGBO 1R/1S - M183	UL9 via CPT	L9: NUGBO M183 SILVA P86 DIDZA N14 BIBPE	No change to SIDs. Traffic leaves M183 at SILVA to bypass CPT
EGKK	KENET 3P/3W (Conv)	L9, N14 via KENET	Q63 via KENET DCT SAWPE	No change to SIDs. DCT connectivity to Q63 from end of SID at KENET
EGKK	NOVMA 1X	NOVMA – L620 – NIBDA – N14 – VOUGA- N14 - KENET	N14/L9: NOVMA L620 NIBDA N14 VOUGA N14 DIDZA N14 OKSAW	No change to SID. Route connectivity changes
EGKK	IMVUR 1Z	IMVUR – N63 – VOUGA – N14 KENET	N14/L9: IMVUR N63 VOUGA N14 DIDZA N14 OKSAW	No change to SID. Route connectivity changes
EGLF	HAZEL	L620 SAM Q41 PEPIS Y321 NUBRI DCT KENET N14	Q63 SAM Q41 PEPIS Y321 NUBRI N14 HEKXA SAWPE Q63 OZZIL	No change to SID. Route connectivity changes
EGHI/HH Dep (W/bound)	N/A	PEPIS Q41 TABEN DCT KENET N14	Q63: PEPIS Y321 NUBRI HEKXA SAWPE	No SID. Route connectivity changes
ECMC Dep	N/A	HEN DCT CPT UL9 KENET	L9: HEN N84 DIDZA OKSAW	No SID. Route connectivity changes
EGVN	N/A (vectored)	Q63 via MALBY	Q63 via CONKO	Vectored to points CONKO on Q63 (circa 1.5NM north of extant)

Table 16 Proposed amendments to LTMA SIDs / connectivity

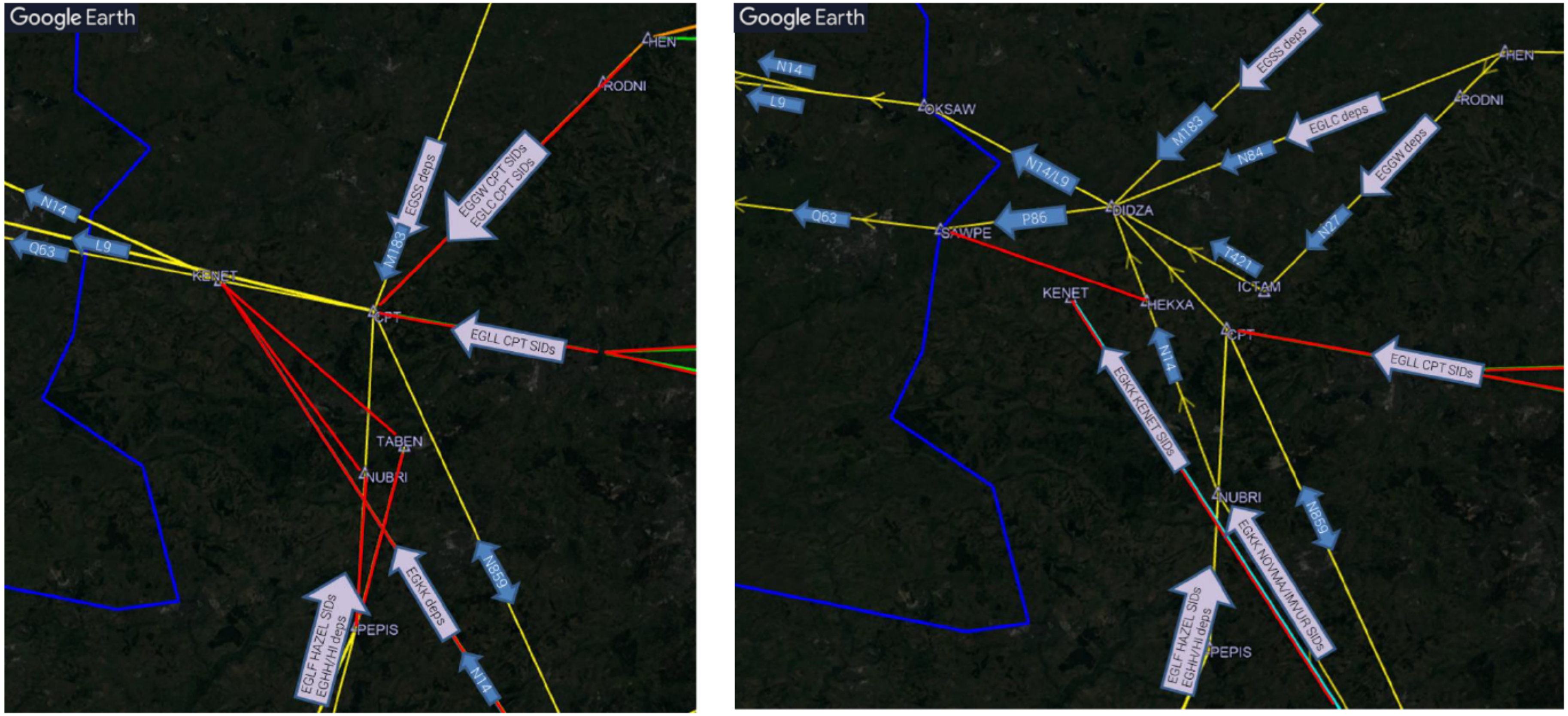


Figure 27 Current departure procedure connectivity for LTMA interface (EGLL, EGLC, EGGW, EGSS, EGKK, EGHH, EGHI, EGLF airports) (left) and proposed departure connectivity (right)

5.11 Northern Interface (MTMA)

5.11.1 This section describes the LD1.1 interface with airports and airspace to the north.

5.11.2 Airports in the Manchester Terminal Manoeuvring Area (MTMA) with procedures which will be affected are Manchester and Liverpool. There are no changes to the proposed design of this interface as a result of consultation feedback. Engagement with all airports affected by the proposed changes at this interface has developed this design and has been evidenced through the ACP process. See Section 6 Impacts and Consultation.

5.11.3 Currently there are two parallel permanent routes plus one Conditional Route (CDR), which largely separate the northbound (N864) and southbound (N862) traffic. Northbound traffic via the MTMA utilises ATS route N864. Southbound traffic utilises ATS route N862. Traffic on southbound P16 and P17 converge with N862 at NOKIN. See Figure 28 for current connectivity.

5.11.4 Arrival procedures (STARs) for Manchester and Liverpool connect with N864. Traffic heading north-east diverges on P17 or the weekend-only high level UP16.

5.11.5 Departure procedures (SIDs) from Liverpool and Manchester connect with southbound N864 – N62 - N862.

5.11.6 Where the LD1.1 airspace links with today's MTMA legacy airspace, it is proposed that there would be four north/south routes. This systemised flow of traffic has two northbound routes on the west side, and two southbound routes on the east-side. The usage of the routes would be as follows:

- P16 (Northbound): MTMA arrivals
- N864 (Northbound): Bristol, Cardiff & Exeter departures to the north
- N862 (Southbound): Bristol, Cardiff & Exeter arrivals from the north
- P17 (Southbound): MTMA departures

5.11.7 Overflights will generally use the FRA airspace above.

5.11.8 The new routes would converge to connect with the existing route network at NOKIN/REXAM, beyond which there would be little change to today's network. A new link route (N58) is added BARTN – KARNO. This removes the need for EGNM, EGCN and EGNJ departures to route via NOKIN (see Figure 28).

5.11.9 Traffic flows from several airports would be impacted by the changes at this interface, and route connectivity with some airport procedures would be changed. All changes to flight plan routes, including details on the airport procedures and connectivity with the new routes is detailed in the following diagrams and Tables. For full detail, see the draft AIP (Appendix 1).

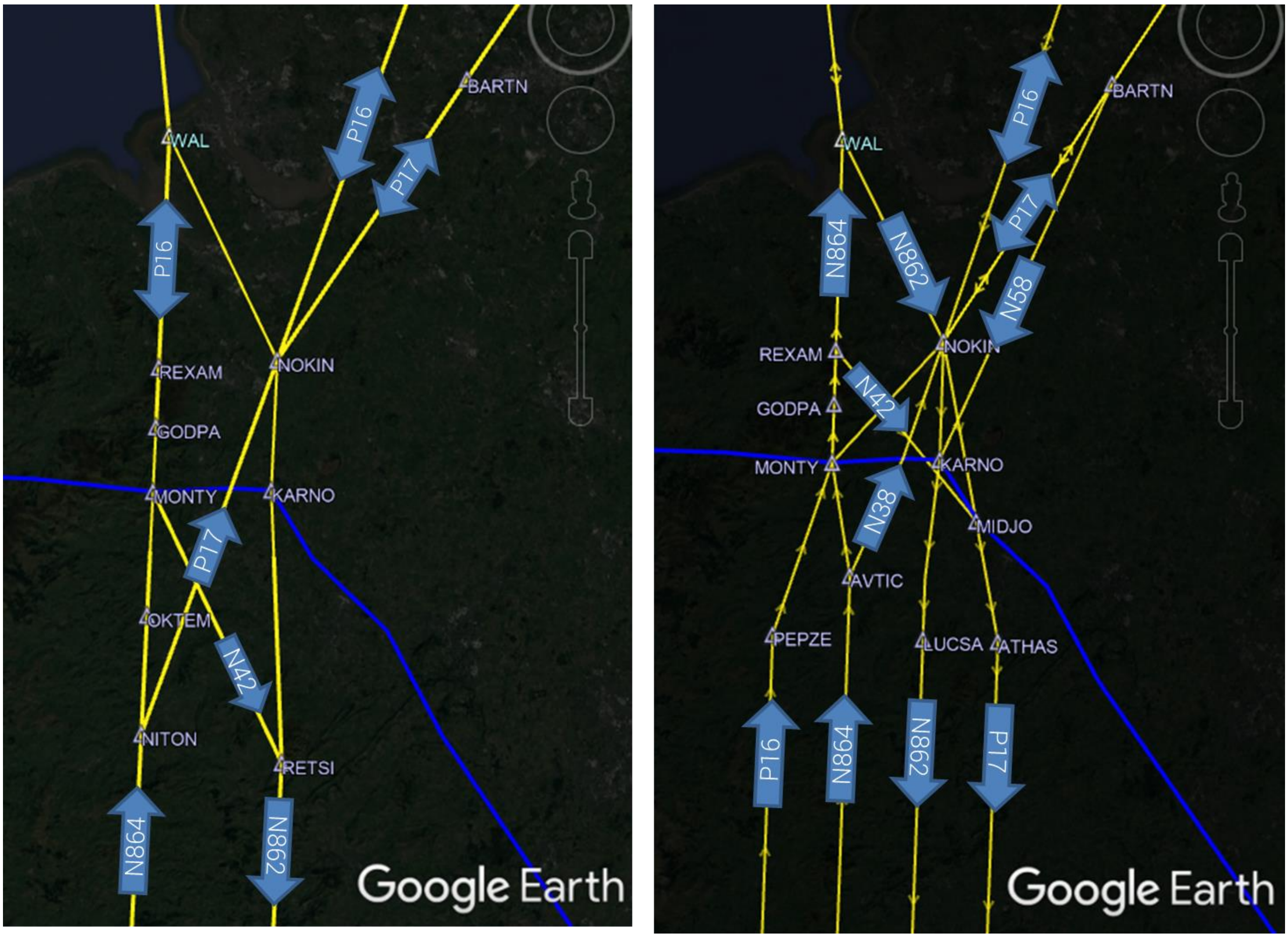


Figure 28 Current connectivity with LD1.1 and MTMA (left) and proposed connectivity (right)

Proposed changes to Airport STARs at MTMA (Northern) Interface

5.11.10 MTMA arrivals currently route via N864 to join airport arrival procedures. The systemised network will deliver MTMA arrivals via new route P16. N864 is being realigned 2nm to the east.

5.11.11 EGCC Arrivals: Manchester arrivals currently route (U)N864 and join the OKTEM 1M STAR at OKTEM. The OKTEM 1M will be realigned to new start point AXCIS, which is 3nm abeam OKTEM to the west on P16. EGCC arrivals will route via realigned P16 to AXCIS 1M. Traffic will be FL200 at AXCIS.

5.11.12 EGGP Arrivals: Liverpool arrivals currently route (U)N864 and join the OKTEM 1L STAR at OKTEM.

5.11.13 The OKTEM 1L will be extended and realigned to new start point PEPZE on P16. EGGP arrivals will route via realigned P16 to PEPZE 1L. Traffic will be FL180 at PEPZE.

5.11.14 The current and proposed arrival procedures as described are illustrated in Figure 29 overleaf.

Airport	Current Procedure	Current route connectivity/STAR	Proposed route connectivity/STAR	**Summary of Change / Impacts**
EGGP	OKTEM 1L	N864: OKTEM GODPA KEGUN	P16: PEPZE MONTY GODPA KEGUN	Realignment of STAR to connect with P16 at PEPZE. Rename PEPZE 1L
EGCC	OKTEM 1M	N864: OKTEM MONTY REXAM WAL MIRSI	P16 AXCIS MONTY REXAM WAL MIRSI	Realignment of STAR from OKTEM to AXCIS to connect with P16 Rename AXCIS 1M

Table 17 Proposed changes to STARs at MTMA (Northern) Interface

Proposed changes to Airport SIDs at MTMA (Northern) Interface

5.11.15 Currently, SIDs from Manchester (EGCC) and Liverpool (EGGP) airports carry southbound traffic through this interface, onto current ATS route N862. The systemised network will carry MTMA southbound departures via re-aligned P17.

5.11.16 EGGP Departures: Current REXAM SIDs would not change. Connectivity will be revised from N862 to P17 at MIDJO, via realigned route N42 from REXAM.

5.11.17 EGCC Departures: Current KUXEM SIDs would not change; they currently connect to P17 and would continue to do so. Traffic will utilise P17 (or N862 for EGGD/EGFF arrivals). The EGCC MONTY SIDs will remain for aircraft leaving controlled airspace at MONTY.

Airport	Current Procedure	Current route connectivity/SID	Proposed route connectivity/SID	**Summary of Change / Impacts**
EGGP	REXAM 2T, 2V	N864 via REXAM	P17: REXAM N42 MIDJO	Route connectivity No change to SIDs
EGCC	MONTY 1S/1Z/1Y/1R	MONTY	MONTY	No change (only used by aircraft leaving CAS)
EGCC	KUXEM 1R/1Y	N862 via KUXEM P17 NOKIN	P17: KUXEM NOKIN MIDJO	Route connectivity No change to SID
EGCC	ASMIM 1S/1Z	N862 via ASMIM P16 NOKIN	P17: ASMIM P16 NOKIN P17 MIDJO	

Table 18 Proposed changes to SIDs at MTMA (Northern) Interface

5.11.18 The current and proposed departure procedures as described are illustrated in Figure 30 overleaf. No other change is proposed at this interface to any other airports' SIDs or STARs.

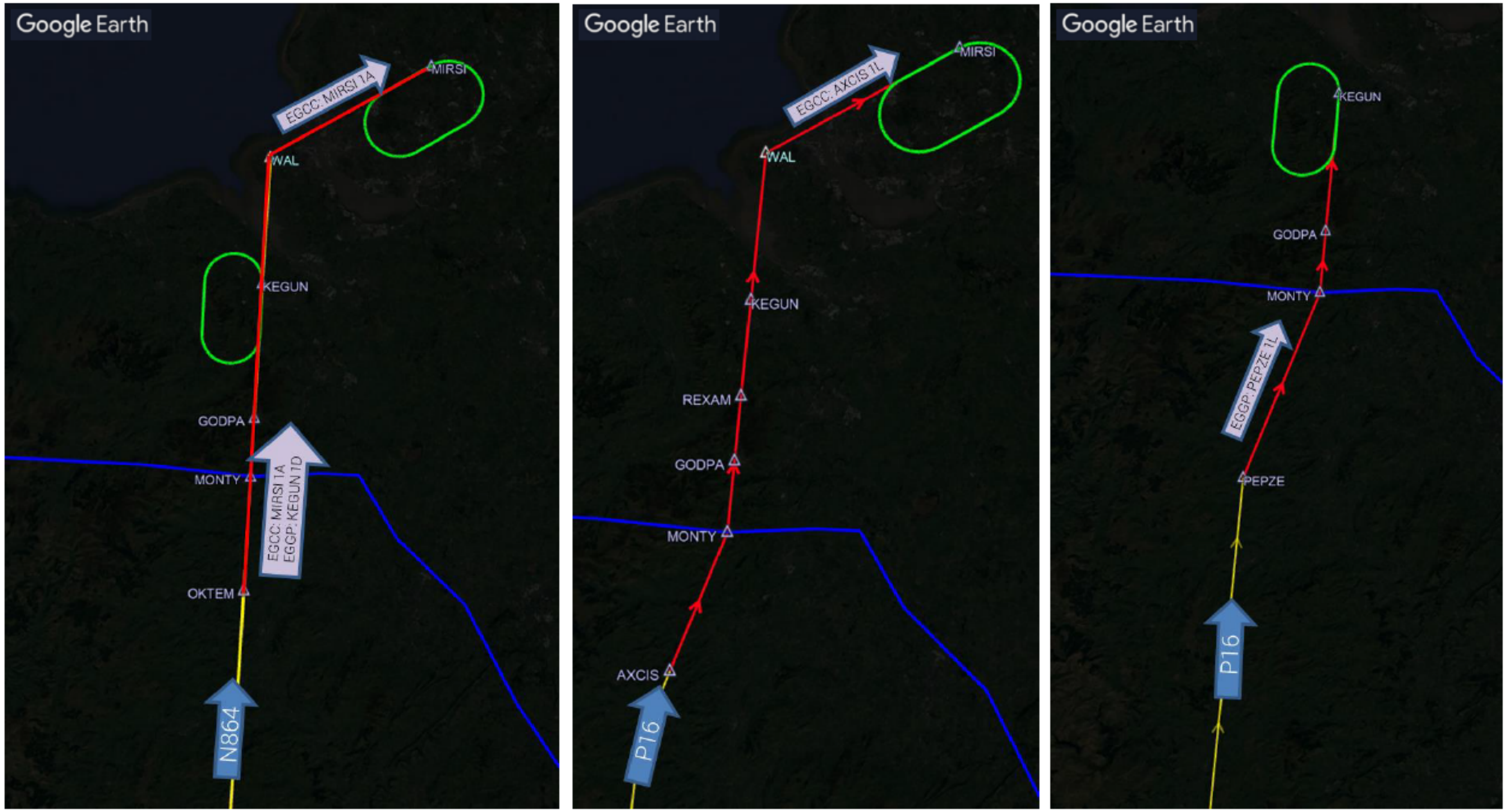


Figure 29 Current arrival procedure & connectivity for EGCC and EGGP (left) and Proposed arrival connectivity for EGCC (Centre) and EGGP (Right)

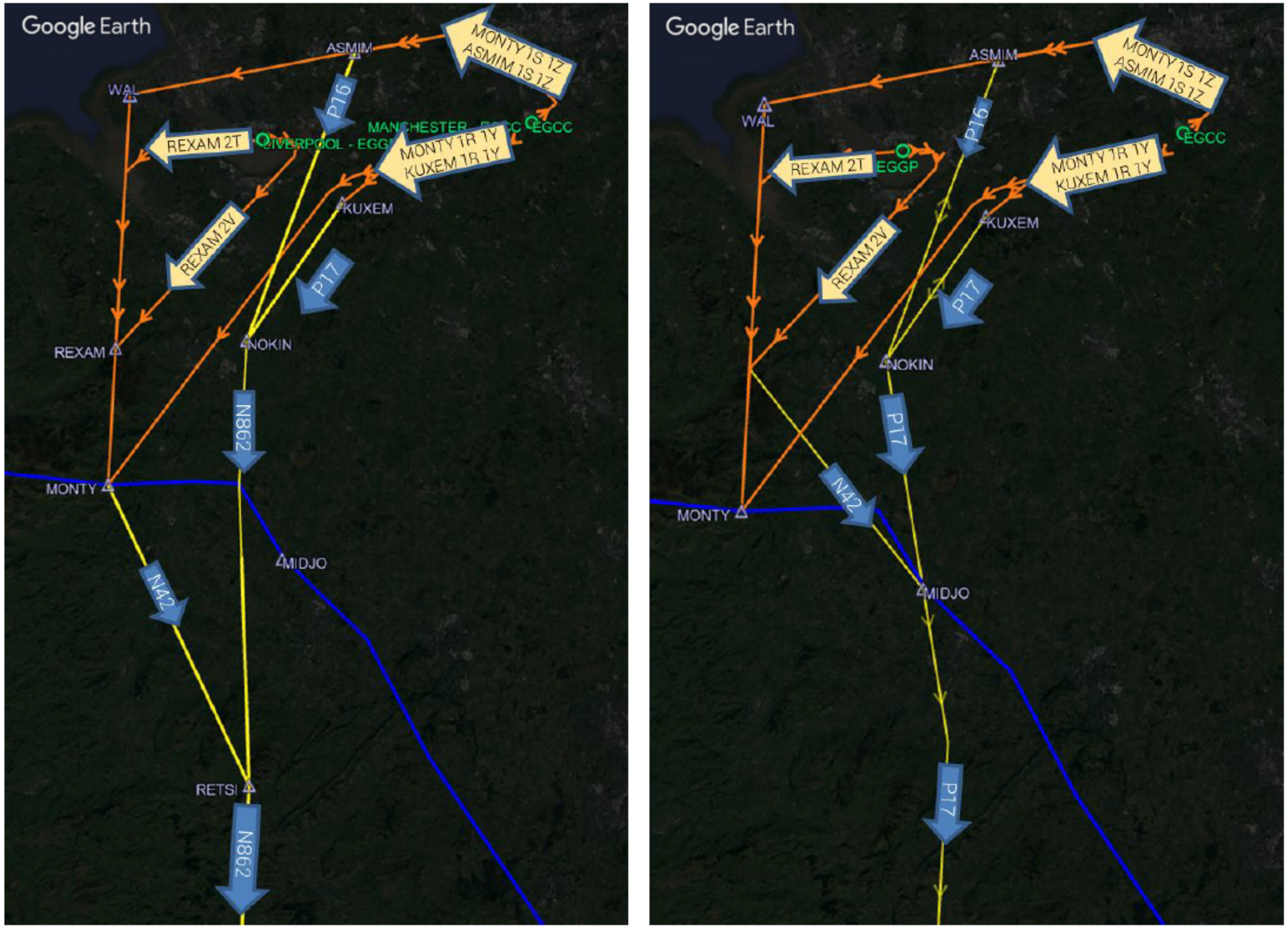


Figure 30 Current EGCC & EGGP departure procedure connectivity (left) & proposed departure procedure connectivity (right)

5.12 Western interface (Ireland)

5.12.1 This interface is used by traffic to/from the south and east airports to Dublin, LTMA Oceanic traffic, and overflights.

5.12.2 The airspace encompasses the UK Danger Area EG D201 complex, which is used routinely for UK military activity. The complex is sub-divided into sections (EG D201A-EG D201J; see Figure 31) and managed by the UK Airspace Management Cell, (AMC) using Flexible Use of Airspace (FUA) principles.[14] This enables both military and civil aircraft to share the airspace to meet military requirements and maximise airspace efficiency.

5.12.3 Currently, the baseline airspace design has options for Dublin arrival flows from the south and east when either or all of EG D201H, J & A are active to their maximum vertical extent. However, as described in 3.3.2, currently when either or both of EG D201F & G are activated above FL145, there are no flight planning options available for Dublin arrivals from the south and east. Traffic is forced to route to the north of the EG D201 danger complex which has a fuel burn and environmental impact. The current lead in time to book EG D201 F&G above FL145 (90 days) is also restrictive.

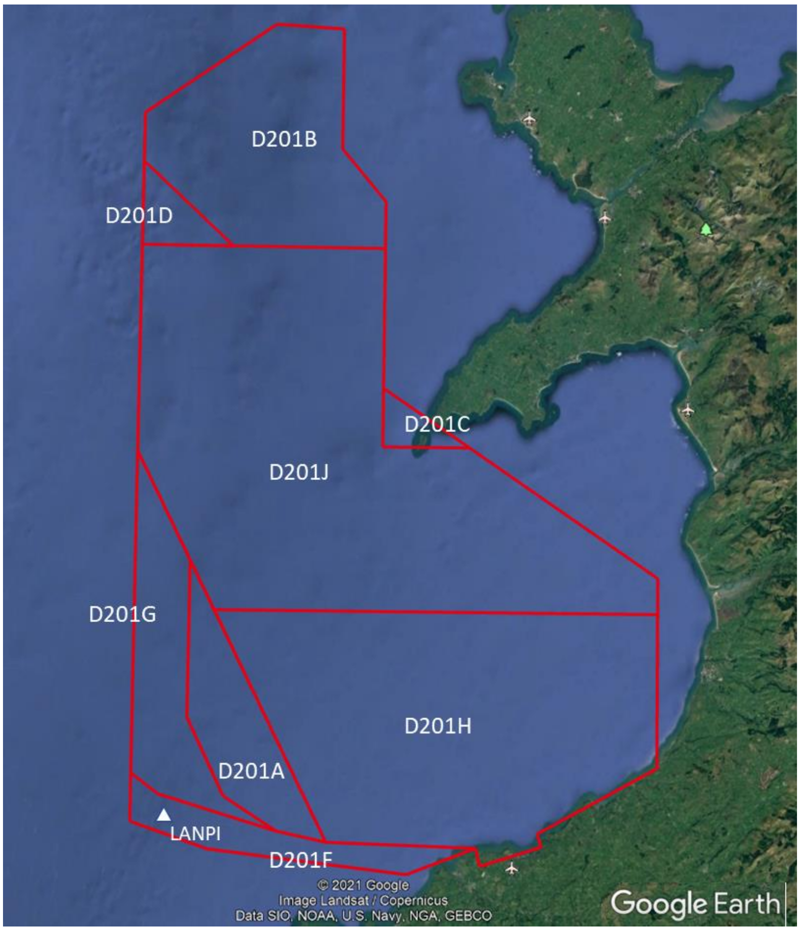


Figure 31 EG D201 Danger Area Complex

[14] FUA Commission regulation (EC) No 2150/2005 of 23 December 2005 laying down common rules for the flexible use of airspace requirements, is the applicable regulation that defines requirements for flexible use of airspace between Military and Civil entities responsible for Air Traffic Management.

5.12.4 NATS has engaged extensively with the MoD and QinetiQ throughout the ACP process to achieve a permanent flight plan option for Dublin arrivals from the south and east regardless of the EG D201 danger area complex configuration which mitigates these issues.

5.12.5 It was established that a redefinition of the danger area boundaries was the optimal solution for aircraft to safely anticipate the turn of the flyby waypoint and re-establish on a straight-line route segment, to avoid clipping the southwestern corner of the danger area, and this has been developed with close working between QinetiQ, the MoD and NATS.

5.12.6 Two options for this were proposed in consultation, and a third proposed solution was developed from the consultation responses. It is this third proposed solution which is being utilised in the final design. See Stage 4A document for further details (Ref 19). This proposed solution mitigates the issues described above.

5.12.7 Currently, Dublin arrival and departure routes to and from the south and east are dependent on the status and configuration of the EG D201 danger area complex, as shown in Table 19 below.

5.12.8 When EG D201F & G are active above FL145, LTMA westbound oceanic traffic that routes along N14 is also impacted. The majority of LTMA westbound Oceanic traffic has to flight plan alternative routes. For this reason, EIDW arrivals that overfly the UK generally flight plan via BAGSO to route to the north of the danger area complex.

5.12.9 Dublin departures to the southeast route via the PESIT SID and enter the UK FIR at BAKUR.

5.12.10 Oceanic traffic enters/exits UK FIR via COPs BAKUR/SLANY/BANBA.

5.12.11 To maximise traffic flow options and provide environmental benefits a new coordination point (COP) ENJEX will be introduced southwest of SLANY on the FIR boundary.

5.12.12 To maintain a systemised structure when EG D201F & G are active above FL145, new coordination point (COP) RUKOH will be introduced southwest of BAKUR for Dublin departure traffic and NIRIF, northeast of BAKUR, for Dublin arrivals traffic.

5.12.13 This change proposes a systemised interface between Dublin and Swanwick which would improve the interaction with the EG D201 danger area complex. Engagement with QinetiQ, the MoD, the IAA and NATS has determined that the optimal solution to resolve the issues identified above would be to redefine the corner of the EG D201 complex in order to create a new danger area segment, with a maximum upper level of FL145.

5.12.14 The creation of a new segment to enable a Dublin arrival option when EG D201F & G are active above FL145 means traffic would no longer have to flight plan via BAGSO, offering fuel and CO_2e benefits. It also negates the requirement for the 90-day notice period, which was identified as a key benefit for the MoD (QinetiQ) during engagement.

5.12.15 The proposed route around the southwest corner of the EG D201 danger area complex would enable traffic to take advantage of tactical clearance to transit the danger area, again optimising environmental benefits.

5.12.16 As described in the 4A Update Design document, engagement and consultation with stakeholders has led to the final design presented here, where the new segment EG D201K is created as shown in Figure 32. This would have a maximum upper level of FL145. This is necessary to ensure that when the aircraft FMS anticipates the turn for the flyby waypoint (EVTOL), the aircraft trajectory remains outside of the SUA.

5.12.17 Table 19 shows the flight plannable options for each Danger Area configuration, dependent on the danger area activation status, for both the current airspace and for the proposed change. The available routings to/from Dublin are described below. Diagrams to illustrate the available routings dependent on Danger Area activations are shown below (Figure 33 & Figure 34).

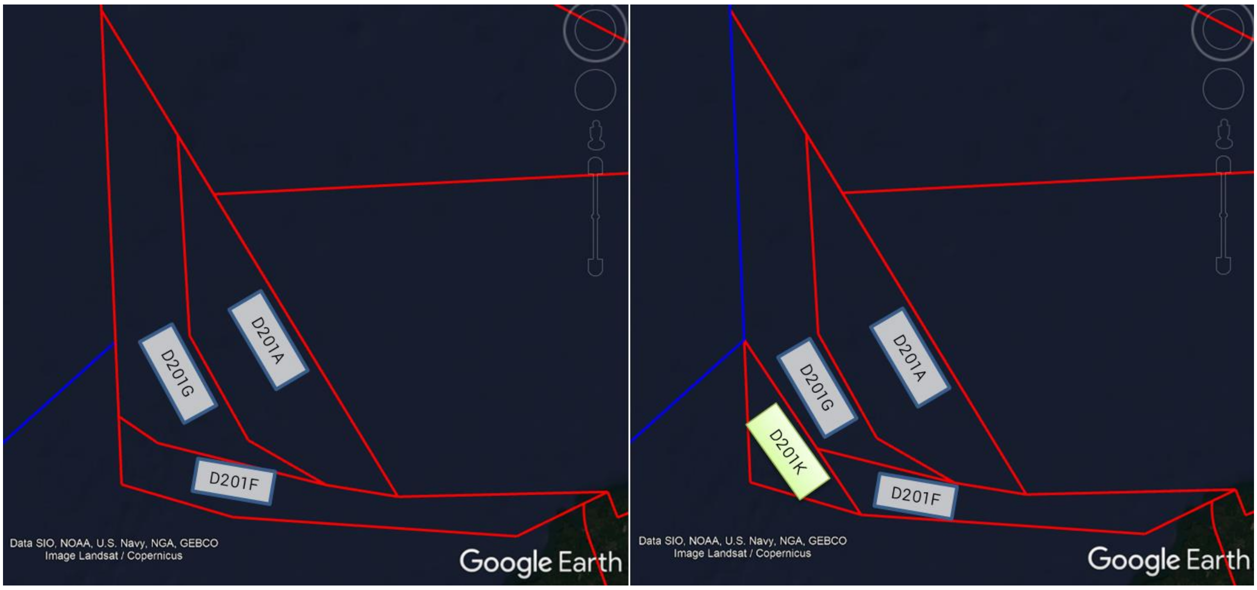


Figure 32 Current Danger Area EG D201F and EG D201G (left) and proposed change with new area EG D201K (right)

5.12.18 Currently, all traffic utilises the bi-directional Q63 with converging/diverging point at Strumble (STU).

5.12.19 At the interface there would be a general tactical orientation of traffic whereby the eastbound traffic is on the southside (realigned Q63), and the westbound traffic is to the north (realigned L9), with the two separate routes replacing the current bi-directional Q63.

5.12.20 FRA Arrival Points for Dublin are LEMGU, LANON, and TIGBA.

5.12.21 No change is proposed to the use of the STU reduced coordination area (RCA), and therefore it is expected that most Dublin arrivals would be provided with a tactical direct to VATRY to reduce flight distance, fuel burn and CO_2e emissions.

5.12.22 The proposed changes facilitate a reduction in track mileage of approx. 18NM against the current baseline of traffic routing via BAGSO should the EG D201A, F & G be active[15].

	Dublin Arrivals from Southeast		Departures via PESIT SID		
Danger Area Configuration	Current (baseline)	Proposed	Current	Proposed	Figure
All inactive	L18 to LIPGO M17 to VATRY Q63 to VATRY	L18 to LIPGO M17 to VATRY Q63 to VATRY	BAKUR N546	BAKUR N24	33(L)
EG D201H/J active	M17 to VATRY, Q63 to VATRY	M17 to VATRY Q63 to VATRY	BAKUR N546	BAKUR N24	33(R)
EG D201H/J/A active	Q63 to VATRY	Q63 to VATRY	BAKUR N546	BAKUR N24	34(L)
EG D201H/J/A/G above FL145 active	Nil	N546/N12 to NIRIF	BAKUR N546	RUKOH N18	34(R)
EG D201H/J/A/G/F above FL145 active	Nil	N546/N12 to NIRIF	BAKUR N546	RUKOH N18	34(R)

Table 19 Current and Proposed route configurations for DG201

[15] As this traffic is explicitly linked to the D201 complex, the analysis assumed no Danger Area activity. As BAGSO is outside of the geographical scope of the LD1.1 area, this traffic sample was captured separately.

When EG D201 danger area complex is inactive, Dublin arrivals can route LANON-L18-LIPGO, NICXI-M17-VATRY or LANPI-Q63-VATRY to join the existing STARs. Departures via PESIT SIDs to BAKUR-N24

When EG D201H or J are active, Dublin arrivals can route NICXI-M17-VATRY or LANPI-Q63-VATRY to join the existing STARs. Departures via PESIT SIDs to BAKUR-N24

Figure 33 EG D201 complex - all inactive (left); EG D201 H & J active (right)

When EG D201A is active, Dublin arrivals can route LANPI-Q63-VATRY to join the existing STARs.
Departures via PESIT SIDs to BAKUR-N24

When EG D201F and/or G are active, Dublin arrivals can route NICXI-N546-EVTOL-N12-NIRIF; to connect to the existing VATRY STARs.
Departures via PESIT SIDs to RUKOH-N18

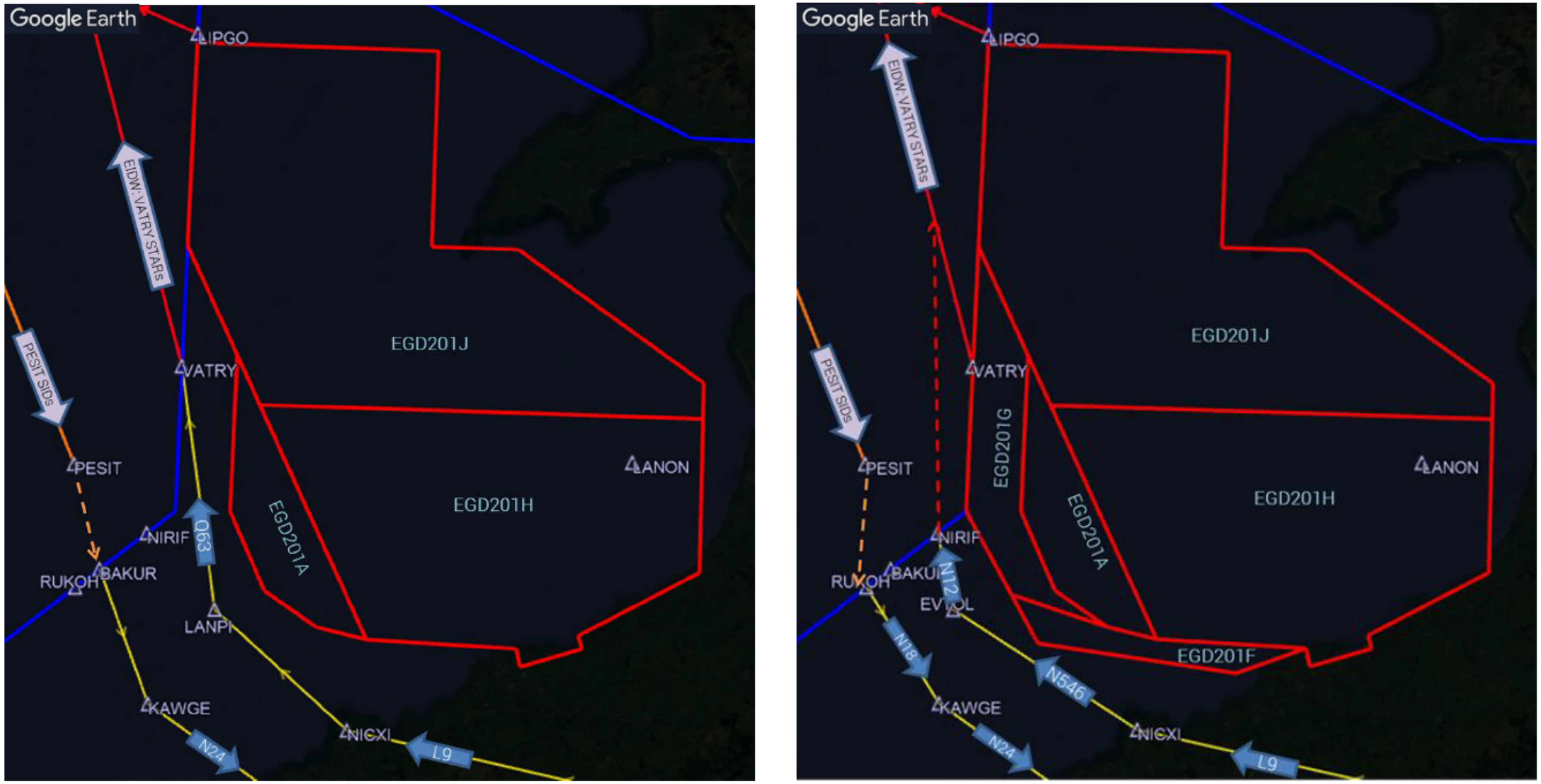


Figure 34 EG D201 complex - EG D201 H / J / A active (left) and EG D201 all active (right)

5.13 Southern interface (Brest/Channel Islands)

5.13.1 This interface is at the southern boundary of the London UK FIR. At this interface, the ATS routes below FL195 interface with the Channel Islands Control Zone[16] and routes above FL195 interface with Brest ACC airspace. These are therefore referred to separately as the Brest Interface and the Channel Islands Interface and combined as the Southern Interface.

5.13.2 Two options were proposed at consultation for this interface. Feedback from Brest ACC during consultation has led to a revision of the consulted design (see Stage 4A Update Design document (Ref 19)) and this final design is presented here. Detail is provided on the baseline and the proposed change for both Brest (above FL195) and Channel Islands (below FL195) interfaces.

5.13.3 There is no change proposed at this interface with regards to any airport's SIDs and STARs. Connectivity with the Channel Islands SIDs and STARs would be at the existing STAR start points and SID end points.

5.13.4 There is no change proposed to the airspace operated by Channel Islands ATC, however, design changes north of SKESO are proposed for the AC route network.

Brest Interface

5.13.5 Figure 35 overleaf shows the extant ATS route network at the Southern interface, and the proposed changes described below.

5.13.6 N862 via SKESO is a bi-directional ATS route from FL85 - FL245 between London FIR and Brest ACC. Additional southbound connectivity at the weekends is via N90 which exits via SKESO.

5.13.7 Channel Islands group arrivals & departures start/finish at SKERY on N862. Additional weekend network connectivity is provided for Channel Islands group arrivals via the use of L149 to BIGNO.

5.13.8 The proposed changes will introduce low-level systemisation of the routes with the introduction of two new RNAV1 routes to/from to SKESO at the FIR boundary, P16 and N90.

5.13.9 Northbound traffic will utilise P16; Southbound traffic will utilise N90. Jersey Group arrivals will use realigned N862 to join to SKERY. RNAV5 connectivity is via extant N862 between SKESO-SKERY and the realigned N864 from SKERY – BHD. Weekend traffic remains on L149.

5.13.10 Traffic above FL245 would be in FRA. FRA connectivity to/from the systemised route structure is abeam BHD (Berry Head) to the FIR boundary.

5.13.11 There are currently two bi-directional coordination point (COPs) to/from the London FIR (SALCO & ANNET) for traffic with RFL245 and above.

5.13.12 A new high level coordination point (COP) will be introduced west of SALCO on FIR boundary for northbound traffic only (NOZHU). SALCO will be designated for southbound only traffic.

5.13.13 Allocating/implementing new unidirectional COPs provides the opportunity to reduce complexity for both London Airspace Control (LAC) and Brest[17], by enabling an improved traffic flow around this busy southern interface.

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[16] Channel Islands CTR SFC-FL80, Channel Islands TMA FL80-FL195.

[17] The EUROCONTROL Network Manager (NM)/ERNIP Airspace Restructuring Programme (ARP) identifies a requirement to reduce complexity and workload at the interface between London ACC and Brest ACC (West interface), specifically to decongest the single COP SALCO with additional entry/exit points (ARP022S). This proposal, in line with the FRA D2 ACP, seeks to rectify this network issue and provide a more efficient interface.

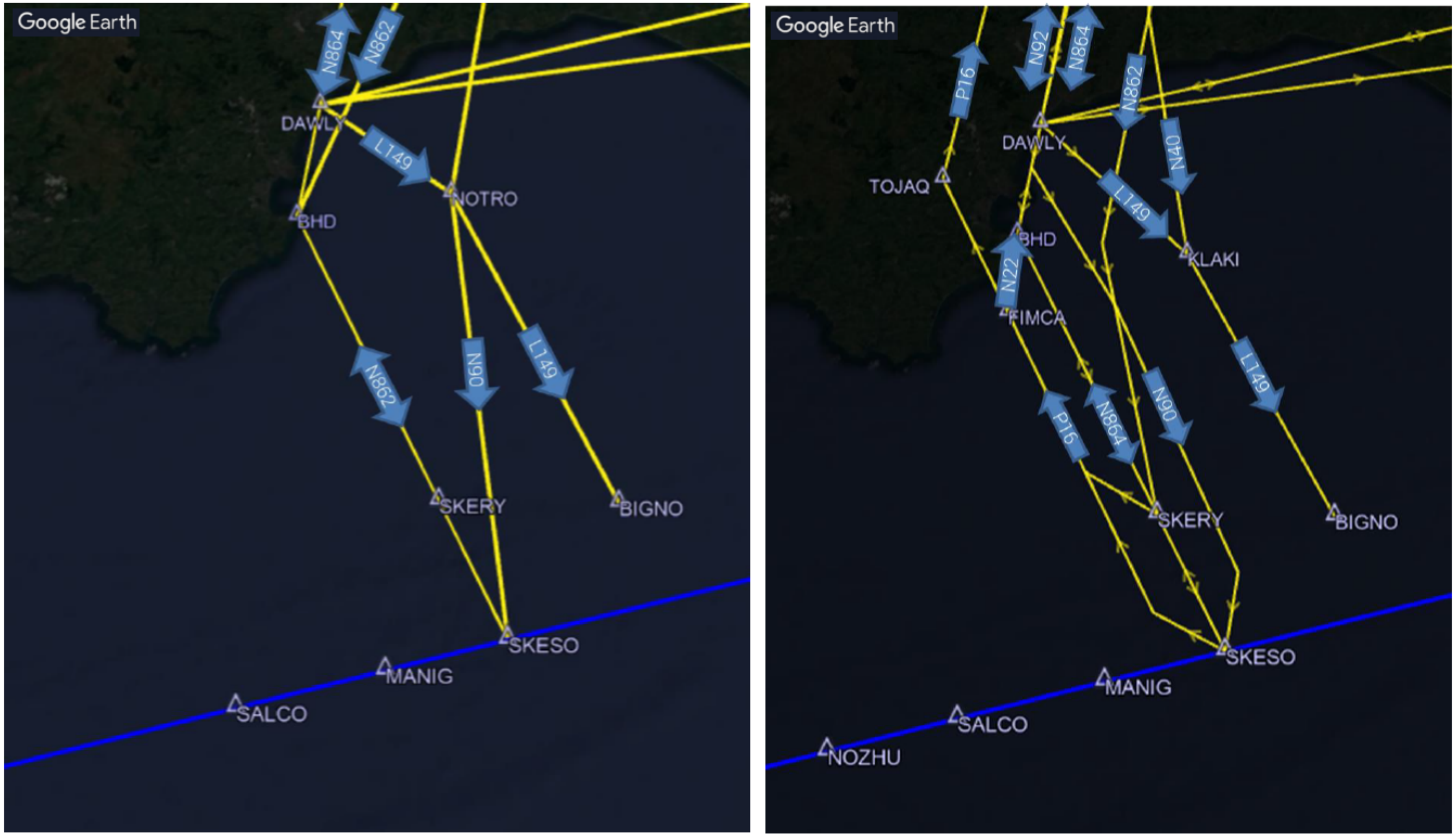

Figure 35 Southern interface: Current route network (left) and proposed route network (right)

Channel Islands Interface

5.13.14 There are no proposed changes to Jersey/Guernsey SIDs or STARs, however route connectivity will be changed to align with the proposed route revisions. The arrival/departure point will remain SKERY/BIGNO.

Channel Islands Group Departures:

5.13.15 Channel Islands group departure procedures currently finish at SKERY on N862 and there are no changes proposed to this.

5.13.16 Table 20 describes the current (baseline) route structure and the proposed route connectivity changes, as shown in Figure 36.

Airport	Connecting SIDs/Route	Current route/ Connecting point	Proposed route/ Connecting Point	Change/ Route connectivity
EGJJ	OYSTA 2B; SKERY 3A, SKERY 2B	N862 via SKERY	SKERY L22 EMWIP P16 RNAV5 traffic: SKERY N864 BHD	Route connectivity No change to SIDs
EGJB	SKERY 3W SKERY 3E	N862 via SKERY	SKERY L22 EMWIP P16 RNAV5 traffic: SKERY N864 BHD	Route connectivity No change to SIDs

Table 20 Channel Islands Group Departure Connectivity

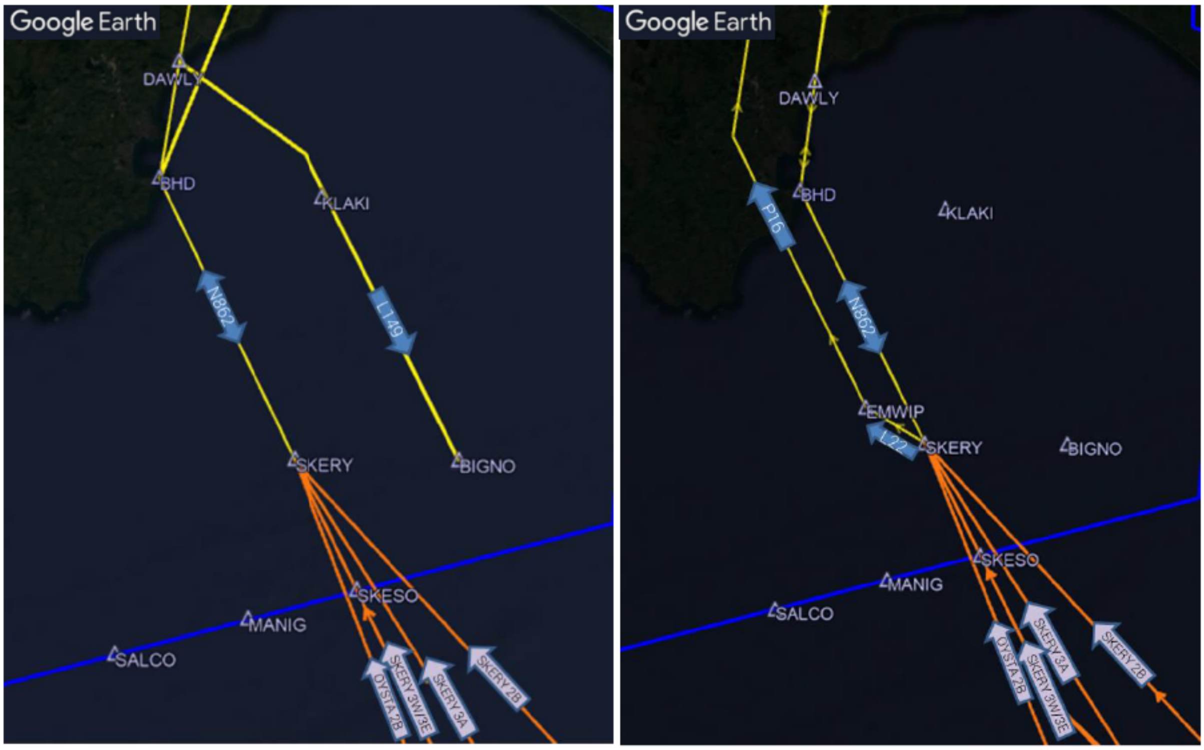

Figure 36 Channel Islands Group: Current departure Connectivity (left) and proposed departure connectivity (right)

Channel Islands Group Arrivals:

5.13.17 Channel Islands group arrivals start at SKERY on N862. Additional weekend network connectivity is provided for Channel Islands group arrivals via the use of L149 to BIGNO. There are no changes to the arrival procedures; changes are proposed to connect with the revised network. Table 21 describes the current (baseline) route structure and the proposed changes, as shown in Figure 37.

Airport	Current Procedure	Current route connectivity/STAR	Proposed route connectivity/STAR Point	**Summary of Change / Impacts**
EGJJ	JW 2R, 2P, 2Q	L149 – BIGNO (weekend only)	L149 – BIGNO (weekend only)	No change to STAR or route connectivity
EGJJ	JW 1F, 1N, 1M	N862 -SKERY	N862 SKERY RNAV5 traffic: N864 SKERY	Route connectivity No change to STARs
EGJB	Guernsey 2H	L149 – BIGNO (weekend only)	L149 – BIGNO (weekend only)	No change to STAR or route connectivity
EGJB	Guernsey 1F	N862 -SKERY	N862 SKERY RNAV5 traffic: N864 SKERY	Route connectivity No change to STARs

Table 21 Channel Islands Group Arrival Connectivity

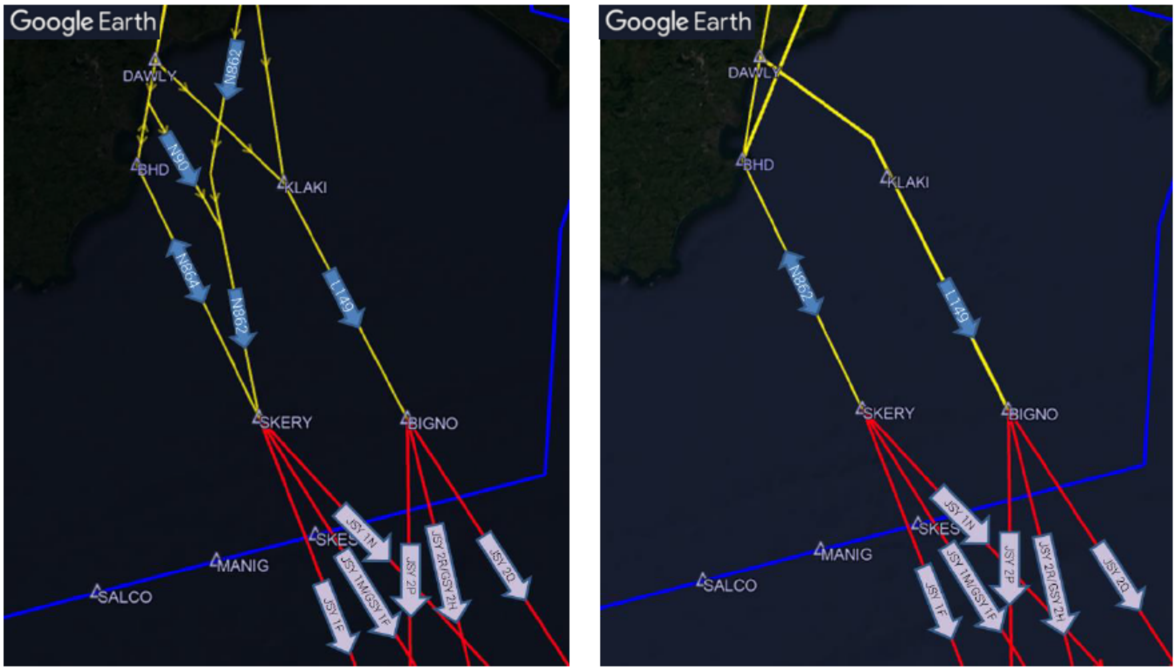

Figure 37 Channel Island Group: Current arrival connectivity (left) and proposed arrival connectivity (right)

5.13.18 The proposed changes result in an increase in track mileage of ~ 3NM against the current baseline. This presents a disbenefit for fuel burn/CO_2e at this interface; a result of the systemised parallel route structure which introduces a small extended track mileage. It will enable improved climb profiles through separation of traffic flows.

5.14 Special Use Airspace (Flight plan Buffer Zones)

5.14.1 A Flight plan Buffer Zone (FBZ) is an area (always associated with Special Use Airspace (SUA)) promulgated to ensure adequate flight plan trajectory separation from active Danger Areas or other SUA.

5.14.2 The requirement for a buffer between ATS Routes and SUA is set out in the CAA's 2014 SUA - Safety Buffer Policy for Airspace Design Purposes (Buffer Policy) (Ref 7).

5.14.3 To support the safe introduction of proposed LD1.1 changes, NATS has reviewed the application of FBZs to ensure flight plans remain compliant and consistent with policy across the Deployment Area.

5.14.4 The policy states that a Lateral Buffer Requirement of 5nm from the edge of an airway, TMA, CTA or CTR, and 10nm from the centreline of Advisory or Upper ATS Route is required for SUAs with activities including Air Combat or High Energy Manoeuvres; Military Exercise; Supersonic Flight; Pilotless Target Aircraft; UAS (Beyond Visual Line of Sight (BVLOS).

5.14.5 Applying the criteria specified would have a significant impact to route flight plan availability, as shown in the below diagrams. Figure 38 shows the airspace as it is today (where the airspace has evolved prior to the publication of the 2014 buffer policy (except for EG D064 A,B &C) and the airspace inclusive of a 10nm external buffer to the SUA volumes within the LD1.1 area.

Figure 38 Airspace today (left) and Airspace with 10nm buffer applied to SUA (right)

5.14.6 The policy has such an impact on airspace capacity (as shown above) it would prohibit the ability to deliver specific initiatives of the CAA's AMS (Ref 1). Applying the criteria specified would have a significant impact to route/trajectory flight plan availability, which is likely to result in one of the following outcomes:

- Negatively impact efficiency and environmental benefits
- Negatively impact defence and security objectives

5.14.7 To make the case for policy dispensation it is necessary to determine a minimum safe distance that an aircraft can flight plan from each SUA. With input from the MoD, NATS has conducted a hazard identification, risk analysis and assessed the mitigations that can be considered (in accordance with the CAP760 guidance (Ref 8)). As a result, dispensation is sought for the standard buffer requirement used for SUA activity, other than autonomous high energy manoeuvres, to be 1NM. The buffer requirement for autonomous high energy manoeuvres that is proposed is 5NM. The required 2000ft vertical buffer will be applied.

5.14.8 Where an SUA lists multiple possible activities that can take place within the volume, multiple FBZs have been created corresponding to the appropriate buffer requirement of the activity; depending on the activity that is booked in the SUA, the corresponding FBZ with the appropriate buffer shall be activated accordingly. NATS propose to activate a FBZ in IFPS which corresponds to the activity being conducted within the SUA. This will be achieved through existing Airspace Management processes. The full list of FBZs being established are detailed in Table 22 below.

5.14.9 The design does not intend to apply a buffer between SUA and CTAs due to the assurance being provided when the FBZ makes associated routes unavailable for flight planning in IFPS.

5.14.10 The FBZ design for the SUAs contained in (or that interact with) the LD1.1 Airspace has been assessed in a HAZID workshop. The associated hazard mitigation is provided in the HAZID report, which is supplied to the CAA as Appendix 32).

5.14.11 NATS has sought specialist advice from the CAA as advised in the policy. The CAA advised that they cannot make a decision on specific elements of the proposal prior to Stage 5 of the ACP process.

Special Use Airspace	1NM & 5NM FBZ	1NM FBZ only	5NM FBZ only
FOST Danger Areas	EG D003 EG D008A EG D004 EG D008B EG D006A EG D008C EG D007A EG D009A EG D007B EG D013	EG D012	
Oakhampton		EG D011A EG D011B EG D011C	
Castlemartin		EG D113A EG D113B	
Manorbier		EG D115A EG D115B	
Salisbury Plain Training Area		EG D123 EG D124 EG D125 EG D128	
Pendine		EG D117	
Pembrey		EG D118	
Aberporth Ranges	EG D201A EG D201D EG D201B EG D201H EG D201C EG D201J	EG D201F EG D201G EG D201K	
West Wales		EG D202A EG D202B EG D202C EG D202D	
Sennybridge		EG D203	
South West Managed Danger Areas			EG D064A EG D064B EG D064C
North Wales Military Training Areas			South Low South High North Low North High

Table 22 FBZ requirements

5.14.12 NATS is therefore requesting dispensation from the CAA SUA Buffer Policy for this ACP to support the proposed designs of FRA D2 and LD1.1.

6. Impacts and Consultation

6.1.1 NATS has been actively involved in meetings and stakeholder engagement relating to the implementation of LAMP, and the FASI-S airspace modernisation programme for several years.

6.1.2 During Stage 1 of this process, 11 Design Principles (DPs) were set. These were defined in the Stage 1 Design Principles document (Ref 10).

6.1.3 We created design concepts, evaluated them against the DPs, progressed some, rejected others, and refined the remaining designs into Design Option 4 and 6 ready for consultation.

6.1.4 NATS commenced a focused consultation on the proposed airspace changes on 6th September 2021. The consultation was conducted via the CAA online portal where users could submit a formal response. We completed all the consultation and engagement activities described in our Consultation Strategy Document (Ref 15) and targeted those stakeholders listed in Appendix A of that document.

6.1.5 The consultation was open for twelve weeks; closing on 29th November 2021.

6.1.6 The Step 3D Collate and Review document (Ref 18) provides a detailed summary of the consultation and engagement activities, and provides analysis of the feedback. Changes were made to the design as a result of consultation responses, alongside some technical amendments. These are all described in 4A Update Design (Ref 19).

6.2 Net impacts summary

Category	Impact	Evidence
Safety/Complexity	Nothing is foreseen which will impact on current safety performance. Identified safety issue is permanently mitigated by design.	See Section 3.4 and Section 9 and Appendix 32
Capacity/Delay	Introducing systemised routes will provide an efficient deconflicted network with added connectivity to UK FIR exit areas yielding capacity benefits and a reduction in ATC complexity; this is expected to increase controller enabled capacity. Connectivity to FRA at higher levels enables increased flight planning flexibility which could avoid capacity constrained areas and reduce delay.	See Section 3.3, and Section 5.1 See Final Options Appraisal (Ref 20)
Fuel Efficiency/CO_2e	Total annual savings forecast: -1,452 tonnes fuel / -4,617 tonnes CO_2e (2023) -2,020 tonnes fuel / -6,422 tonnes CO_2e (2033)	See Section 6.4 See Final Options Appraisal (Ref 20)
Noise – Leq/ SEL	No impact, this is a Level 2B change[18]. Environmental analysis scaled equivalent to a Level 2 change.	See Section 6.5 See Final Options Appraisal (Ref 20)
Tranquillity, visual intrusion	No impact. Environmental analysis scaled equivalent to a Level 2 change.	See Section 6.5 See Final Options Appraisal (Ref 20)
Local Air Quality	No impact, this is a Level 2B change. Environmental analysis scaled equivalent to a Level 2 change.	See Section 6.5 See Final Options Appraisal (Ref 20)
Other Airspace Users	Changes to CAS are proposed; this results in a net release of CAS which is a benefit to General Aviation.	See Section 6.3

[18] The CAA agreed that this proposal falls under the airspace change process as a Level 2B proposal. This is a proposal which affects controlled airspace over the sea and controlled airspace at or above 20,000ft and does not alter traffic patterns below 7,000ft. The Government's Air Navigation Guidance states that below 7,000ft is the maximum height at which noise is a priority for consideration; therefore, noise analysis has not been completed for this proposal.

6.3 Units affected by this proposal

6.3.1 NATS has engaged with all relevant stakeholders on the planned changes through individual briefings, multi-agency meetings and design workshops, to help refine the options and coordinate the timescales. Links to the consultation were placed on the NATS Customer Website and on the NATS public website.

6.3.2 A targeted group of aviation stakeholders were specifically engaged for this consultation. These included ANSPs who border the NATS London UIR; CFSPs; Airports; National Air Traffic Management Advisory Committee (NATMAC) members; Airlines; and the Ministry of Defence (MoD). See the Consultation Strategy document (Ref 15) for a list of these stakeholders, a description of engagement activities and reasoning behind why these specific stakeholders were targeted[19].

Air Navigation Service Providers

6.3.3 IAA: The FIR boundary between Swanwick AC West sectors and the IAA is extensive, involving large numbers of aircraft transiting to / from predominantly Irish airfields, as well as Oceanic traffic. As such, engagement has been substantial. The key topics which this two-way engagement for LD1.1 has covered are:

- COPs usage, new COPs RUKOH and ENJEX
- EG D201 danger area complex and the Dublin interface
- Climb / descent profiles for EIDW traffic
- EIDW new runway impact

6.3.4 The IAA responded in support of the proposed changes, with a preference for Option 6.

6.3.5 Brest ACC: The interface between Swanwick AC West sectors and Brest has limited COPs, meaning 'pinch points' can appear in the network for both ANSPs. As such engagement has been regular since the start of the project. The key topics which this two-way engagement for LD1.1 has covered are:

- Modernising the network to reduce complexity, RT, environmental benefits, more predictability, safety benefits, more capacity / delay reduction
- How we reduce complexity and tactical intervention both sides of the FIR boundary
- Flows of traffic > north and southbound
- COP usage, new COP NOZHU

6.3.6 Brest ACC responded in support of the proposed changes, with strong support for Option 6.

6.3.7 Jersey ATC: Engagement with Jersey indicates that the Jersey interface with West works well and changes would not be required. However, LD1 wanted to investigate possible improvements to the interface jointly with Jersey, to ensure that was the consensus view from both parties. The key topics which this two-way engagement for LD1.1 has covered are:

- COP usage and possibilities
- Systemisation
- SIDs / STARs (Jersey did not want to amend due cost)
- Procedure improvements (RFC/RFT)
- Jersey future aspirations

[19] The consultation targeted the stakeholders listed in Appendix A (of that document) – List of Stakeholders but was not exclusive to this list. Any individual or organisation could submit a response; however, we only specifically targeted the organisations listed.

6.3.8 Jersey ATC responded in support of the proposed changes, with strong support for Option 6.

6.3.9 A response was received from NAVIAIR (Denmark); they have no option preference.

Computer Flight planning Service Providers (CFSPs)

6.3.10 LD1.1 will enable increased flexibility in flight planning. Tactical intervention by ATC would be reduced which would result in the trajectories being flown correlating more closely to the fight plan. The implementation of FRA above will further flexibility in flight planning and benefits. Three targeted CFSPs, Boeing, Flightkeys and Lufthansa Systems, responded to the consultation. Flightkeys and Boeing disagreed with Option 4 as an acceptable solution; all 3 agreed/strongly agreed with Option 6 and preference this design option.

Airports

6.3.11 Bristol and Cardiff Airports are most impacted by the proposed changes, and engagement has sought to harmonise the LD1.1 changes with the individual airport ACPs which are running concurrently. There has been substantial engagement since the project began. Activities have included a joint small-scale simulation with a Bristol ATCO in attendance, and both Bristol and Cardiff ATCOs attended the West validation simulations. The key topics which this two-way engagement for LD1.1 has covered are:

- Delegated airspace
- Holds (pre-Bristol & Cardiff ACPs being paused)
- Review of the CTA's with a view of simplifying the bases and assess if CAS can be released back to other airspace users
- RNAV 5 traffic
- Flows of traffic > SIDs and STARs connection to the new systemised network
- Future aspirations for GD & FF ACPs

6.3.12 Bristol Airport responded to the consultation with strong support for Option 6. They stated that NATS have fully consulted with Bristol in respect of LD1.1 and have shown commitment to support the ongoing requirements of Bristol.

6.3.13 Cardiff Airport responded in support of the proposed changes, with strong support for Option 6.

6.3.14 Exeter Airport: As Exeter is outside CAS, LD1.1 has less effect on their operations, nevertheless we have had regular engagement. The key topics which this two-way engagement for LD1.1 has covered are:

- Flows of traffic > traffic orientation in the revised network
- Exeter traffic leaving and joining the network
- Additional CAS for Exeter traffic
- Future aspirations, Exeter ACP

6.3.15 Exeter Airport responded in support of the proposed changes, with strong support for Option 6.

6.3.16 Responses were received from 10 other airfield targeted stakeholders: London Luton Airport, Cornwall Newquay Airport, Farnborough Airport, London City Airport, Bournemouth Airport, Stansted Airport, Manchester Airport, Southampton Airport, Heathrow Airport. All were in support of the proposed changes and gave preference for Option 6, other than Southampton Airport, who had no preference, and stated that they didn't see any impact, and London City Airport, who had no preference.

Military impact and consultation

6.3.17 Design Principle 7 (DP7) stated that the impacts on MoD users due to LAMP will be minimised.

6.3.18 The LD1.1 project has engaged at all stages with the MoD, on multiple engagement sessions and the proposed change is not expected to have an unacceptable impact on MoD operations. Operational Air Traffic (OAT) flight plans would not be adversely affected by the changes. Where large scale military exercises occur, temporary flight plan restrictions would be managed by the CAA, Airspace Regulation (Utilisation) (notified by NOTAM).

6.3.19 The MoD responded to the consultation with no opinion on either option, and no preference. A supplementary document was submitted. All comments are captured in the Stage 3D consultation response document (Ref 18).

6.3.20 The MoD have been consulted on the changes to lateral boundaries of TRA 001, TRA 002, and portions of Class G, as described in Section 5.4. The MoD assess that the reduction in Class G airspace and TRAs reduces the amount of training airspace available in these areas, but this impact is judged to be minimal, providing that current authorised Military ATS providers continue to have the same access to CAS that they currently have, which would be the case.

6.3.21 The MoD has assessed that the eastern boundary of LD1.1 is sufficiently west that it does not have any direct interactions or dependencies with the current RAF Northolt FASI(S) potential route options (arrivals & departures below 7000ft). However, its proximity is relatively close to LD1.1 airspace, as such RAF Northolt arrivals and departures above 7,000ft will regularly interact with LD1.1 airspace. Therefore, the ability for RAF Northolt arrivals and departures to connect into and from LD1.1 airspace is essential and has been accommodated within the proposed design.

6.3.22 As described in Stage 4A Update Design (Ref 19), during consultation the MoD proposed an alternative option for the proposed changes to the EG D201 danger area complex (Aberporth Range). Significant engagement and design work between MoD, QinetiQ and NATS has developed a solution for this airspace which offers fuel and CO_2e benefits and negates the requirement for the 90-day notice period; identified as a key benefit for the MoD (QinetiQ) during engagement. The MoD state this option provides the most flexible use of the area for both NATS and the MoD whilst retaining operational capability now and in the future.

6.3.23 As described in the 4A Update Design (Ref 19) NATS have directly engaged with RAF Brize Norton regarding the changes to the Cotswold CTAs. The amendments to Cotswold CTA 6&7 are not deemed to have an impact on Little Rissington operations or Gateway Pitches. Concerns about fast climbing departures from Fairford have been mitigated with a tactical solution, which would allow faster climbing aircraft to avoid potential level offs.

6.3.24 It is proposed that routes and associated waypoints for Brize arrivals and departures will move approx. 1.5nm north. The current arrival and departure procedures for Brize are being republished by RAF Brize Norton to align connectivity with the proposed network at the revised waypoints as described in the Eastern Interface section. Suitable procedures and levels have been agreed.

6.3.25 Substantial engagement between NATS and the MoD has developed the proposals the FBZs (Section 5.14) and the MoD is in support of the proposal to request dispensation from the CAA Buffer Policy.

6.3.26 The MoD commented in their response that, if the CAA do not grant dispensation from the CAA Buffer Policy, then the MOD would wish to discuss with NATS what the extended ASM protocols would involve as any impact on MOD activity would need to be assessed. See FRA D2 ACP for further details (Ref 3).

General Aviation airspace users' impact and consultation

6.3.27 Design Principle 6 (DP6) states that the impacts on General Aviation (GA) and other civilian airspace users due to LAMP will be minimised. There is not expected to be any impact on general aviation or sport aviation airspace users. Arrangements for the activation of Upper Gliding Areas within the West airspace would be unaffected by the introduction of LD1.1. NATS has taken the views of all stakeholders into consideration and has attempted, where possible, to accommodate GA stakeholder requests in their key areas of interest. In particular, we have endeavoured to release as much CAS as practicable, which has resulted in a significant release of CAS to Class G.

6.3.28 Stakeholders were specifically asked in the consultation if they agreed with this impact assessment and indicated, where they have an opinion, that they agree.

6.3.29 The British Gliding Association (BGA) (consulted via NATMAC) responded with a preference for Option 6, and commented that they feel early, effective engagement has taken the needs of glider pilots into account. They agree that the proposed changes release more airspace than they take, which is of a benefit to gliding in the area. This is in line with Design Principle 5 (DP5) which states the volume of controlled airspace required for LAMP should be the minimum necessary to deliver and efficient airspace design, taking into account the needs of UK airspace users. Consultation feedback from the GA community resulted in changes to proposed CAS in the BHD CTAs. See 4A Update Design (Ref 19).

6.3.30 British Helicopter Association (BHA) responded, with a preference for Option 6, stating it offers the most flexibility.

Commercial air transport impact and consultation

6.3.31 NATS has engaged with all airlines impacted by the proposals directly and via NATMAC engagement. During consultation, 2 airline specific webinars were held, with 19 attendees. As described in the Consultation Response document (Ref 18), additional emails were sent to specifically targeted airlines who are high users of the airspace, to seek their views on the proposed design.

6.3.32 Design Principle 8 (DP8) states that systemisation will deliver the optimal capacity and efficiency benefits. It is expected that this would have a positive impact on the operations of commercial airlines.

6.3.33 Consultation responses were received from ten airline targeted stakeholders: Delta Airlines, Flybe Ltd, Emirates Airline, DHL Air Ltd, Virgin Atlantic, TUI Airline, British Airways, KLM Royal Dutch Airlines, Ryanair and American Airlines. These were all in support of the proposed changes and all preference Option 6. The general theme of responses from airlines was that a consistent and lower FRA DFL is optimal and more efficient.

6.4 CO_2e environmental analysis impact and consultation

6.4.1 Design Principle 3 (DP3) stated that the LD1.1 design will optimise CO_2e emissions per flight.

6.4.2 The environmental analysis requirements for this proposal have been limited to those required for a Level 2 change, CO_2e emissions analysis only. This is due to the reduction of fuel burn and CO_2e emissions being the priority for airspace changes where aircraft operate above 7,000ft. As a result of consultation, the proposed design of LD1.1 has been revised and updated. There have also been minor technical amendments made to the design. For a full description of these changes and impacts, see the Stage 4A Update Design document (Ref 19).

6.4.3 The design changes made in LD1.1 have led to improvements in the expected benefits for LD.1. and the holistic West benefits from those presented at Stage 3[20]. The LD1.1 benefits are calculated as a proportion of the overall West benefit; this has improved the calculated benefits from those previously provided in Stage 3.

6.4.4 CO_2e emissions and fuel burn analysis has been performed using computer simulations which modelled the operation of the LD1.1 airspace. The results of this modelling indicate that the proposed systemised route changes will result in an enabled reduction in average fuel burn and CO_2e emissions per flight.

6.4.5 The NATS Analytics team have completed a final environmental analysis on the proposed changes presented here. Table 23 shows the forecast enabled fuel burn and CO_2e emission differences for the proposed changes in the first full year of implementation (2023) and ten years after (2033).

6.4.6 Due to the interdependency with FRA D2 we have also assessed the benefits alongside those of the proposed FRA D2 changes, to provide cumulative benefit data across the whole airspace (West).

Year	Annual Fuel Burn Change (T)			Annual CO_2e Change (T)		
	FRA D2	LD1.1	WEST	FRA D2	LD1.1	WEST
2023	-1,925	-1,452	**-3,377**	-6,122	-4,617	**-10,739**
2033	-2,677	-2,020	**-4,697**	-8,513	-6,424	**-14,936**

Table 23 Forecast enabled fuel burn and CO2e emission savings

6.4.7 This analysis finds that in the first year of implementation, for LD1.1 airspace there would be an enabled annual saving of 1,452 tonnes of fuel, and 4,617 tonnes of CO_2e. This benefit is the largely the result of revisions to standing agreements which optimise vertical profiles and level capping. The additional benefit of reduced fuel uplift and reduced CO_2e emissions due to the corresponding weight reduction have not been included. It must be noted that LD1.1 will only enable this benefit.

6.5 Local environmental impacts and consultation

6.5.1 The changes proposed impact flights at/above 7,000ft. This is above the 7,000ft threshold stipulated by the Department for Transport (DfT), below which overflights are deemed to have significant impact on stakeholders on the ground. As such, it is assessed to have no significant change to noise or visual intrusion and no change in impact to stakeholders on the ground due to any of the proposed LD1.1change options.

6.5.2 This aligns with the Design Principle 4 (DP4) which stated that minimising of noise impacts due to LAMP influence will take place in accordance with local needs.

6.6 Economic impacts

6.6.1 Design Principle 8 state that systemisation will deliver the optimal capacity and efficiency benefits. The changes contained within this design option introduce new systemised routes. These routes will provide an efficient deconflicted network with added connectivity to UK FIR exit areas yielding capacity benefits and a reduction in ATC complexity, which has been quantified in the Final Options Appraisal (Ref 14). This increases the resilience of the ATC network.

[20] See 4A Update Design document (Ref 19) for all design changes. Enhancement to the Route Availability Document (RAD) to manage traffic flows were also captured in the modelling which provides an improved assessment of potential benefits.

6.6.2 There is no forecast increase in air transport movements, passenger numbers or cargo carried as an outcome of this proposal. The connectivity to FRA at higher levels enables increased flight planning flexibility which would allow aircraft operators to flight plan more efficiently and give them the option of avoiding capacity constrained areas. This ability to avoid restrictions by utilising alternative flight plan trajectories would reduce the likelihood of delay and improve the resilience of the wider network.

6.6.3 Design Principle 2 (DP2) stated that the proposed LD1.1 design will optimise network fuel performance.

6.6.4 The UK government transport analysis, known as 'WebTAG', has been completed in order to quantify the monetary value of the environmental benefits due to greenhouse gas (GHG) emissions (specifically using CO_2e as the measure).

6.6.5 The monetised Net Present Value (NPV) benefit for LD1.1 calculated by WebTAG due to the reduction in per flight GHG emissions is £3,808,698.

6.6.6 We predict an enabled fuel burn cost benefit of £662,809 in 2023, predicted to increase to become an enabled saving of £922,090 in 2033. (NPV based on number of tonnes of aviation fuel saved using the IATA jet fuel price of July 2021, at 634.00 USD per tonne converted to GBP at 0.72£/$ and presumes a constant fuel price and exchange rate).

6.6.7 In line with CAP1616 guidance (Appendix F, para 14) that all environmental assessment requirements should be consistent with the information presented throughout the engagement and consultation, fuel costs have been maintained using costings presented in Stage 3 (July 2021 fuel prices).

6.6.8 CAP1616 also states that the CAA expects the change sponsor to use the most up-to-date and credible sources of data (paragraph E11). Since the submission of the full options appraisal material to the CAA, the cost of fuel has risen significantly. NATS has produced updated benefit figures that consider the impact of this increase. This is provided in this submission in order to provide the most up to date and credible data, in accordance with CAP1616 para E11.

6.6.9 In today's fuel prices, the calculated economic benefit from the proposed changes are an enabled fuel burn cost benefit of £1,637,159 in 2023, predicted to increase to become an enabled saving of £2,277,590 in 2033. (NPV based on number of tonnes of aviation fuel saved using the IATA jet fuel price of May 2022, at 1,392USD per tonne converted to GBP at 0.81£/$ and presumes a constant fuel price and exchange rate).

6.6.10 Full details of the WebTAG results are given in the Stage 4 Options Appraisal (Phase 3 – Final) document (Ref 20) and the WebTAG spreadsheet provided.

7. Analysis of Options

7.1 At Stage 1, we developed the Design Principles via engagement with representative stakeholder groups.

7.2 At Stage 2, NATS developed 7 design options, via engagement with the same representative stakeholder groups. We evaluated each design option and rejected those that did not best meet the Design Principles. This was presented in a summary matrix of Design Options with a rating in relation to each Design Principle.

7.3 The design options were considered as “do nothing” or “implement” – with 2 options developed for implementation throughout this process. “Do nothing” was not considered a viable option as it failed to meet 4 of the design principles.

7.4 The two options progressed for further development and progressed to consultation were:

- Option 4 – Systemisation using PBN routes based on 5nm radar separation environment, with improved connectivity provided by direct routes, interfacing with FRA above FL305 (FL245 in S09).
- Option 6 – Systemisation using PBN routes based on 5nm radar separation, interfacing with Free Route Airspace (FRA) above FL245.

7.5 Synchronising the implementation of systemised routes with the delivery of FRA means the options for LD1.1 could be developed to ensure the two deployments complement each other and maximise benefit.

7.6 NATS specified Option 6 as the preferred option. This systemised airspace with FRA above at FL245 encourages more efficient flight planning behaviour, thus increasing the likelihood of benefit realisation. This option has greater flexibility, is less complex and has the potential to further improve environmental performance.

7.7 NATS undertook a Full Options Appraisal on the 2 options (Ref 17) which quantified the analyses required by CAP1616. Due to the interdependency with FRA D2, we assessed the benefits for both options against the 3 FRA options (Full FRA, partial FRA, limited FRA) against a DFL of FL305 (FL245 in Swanwick AC Sector 9) (LD1 Option 4) and a DFL of FL245 throughout the region (LD1 Option 6). All three FRA options were progressed to consultation.

7.8 The consultation resulted in support for the change. Following feedback, the proposed design of LD1.1 has been revised and updated. There have also been minor technical amendments made to the design. A full summary of the consultation (Ref 16) and the feedback received (Ref 18) are described in the associated references.

7.9 The consultation responses are predominantly in support of NATS' preferred option. A clear preference is made by stakeholders for LD1.1 Option 6, which would introduce FRA with a DFL of FL245 throughout the region. The FRA consultation presented a clear preference for Option 1, which is for the implementation FRA with all ATS routes removed.

7.10 The final design is hereby submitted because it best meets the design principles, the requirements of the AMS, and takes account of consultation feedback.

8. Airspace Description Requirements

	The proposal should provide a full description of the proposed change including the following:	Description for this proposal
a	The type of route or structure; for example, airway, UAR, Conditional Route, Advisory Route, CTR, SIDs/ STARs, holding patterns etc.	See Section 5 and details contained within Draft AIP Changes (Appendix 1)
b	The hours of operation of the airspace and any seasonal variations.	H24 - See details contained within Draft AIP Changes (Appendix 1)
c	Interaction with domestic and international en-route structures, TMAs or CTAs with an explanation of how connectivity is to be achieved. Connectivity to aerodromes not connected to CAS should be covered	See Section 5 and Draft AIP Changes (Appendix 1) and LoAs (Appendices 3-27). Aerodromes outside of CAS will still have connectivity to the network
d	Airspace buffer requirements (if any). Where applicable describe how the CAA policy statement on 'Special Use Airspace – Safety Buffer Policy for Airspace Design Purposes' has been applied.	Flight-plan buffer zones are required; dispensation is sought from the CAA Buffer policy. See Section 5.14 and HAZID report (Appendix 32)
e	Supporting information on traffic data including statistics and forecasts for the various categories of aircraft movements (passenger, freight, test and training, aero club, other) and terminal passenger numbers	The proposed LD1.1 airspace is not expected to result in a change to categories of aircraft or the number of aircraft movements. Ten-year traffic forecasts have been supplied see 4A doc (Ref 19)
f	Analysis of the impact of the traffic mix on complexity and workload of operations	Current usage is shown in Section 3.2. Operational capacity is predicted to increase. See Final Options Appraisal (Ref 20) and Section 9.5 (Human Performance Impacts)
g	Evidence of relevant draft Letters of Agreement, including any arising out of consultation and/or airspace management requirements	See Draft LoAs (Appendices 3-27)
h	Evidence that the airspace design is compliant with ICAO Standards and Recommended Practices (SARPs) and any other UK policy or filed differences, and UK policy on the Flexible Use of Airspace (or evidence of mitigation where it is not)	Redesigning airspace is a major initiative of the CAA's Airspace Modernisation Strategy (AMS CAP1711) (Ref 1). This proposal delivers the aims of the AMS whilst also meeting CAA, ICAO and EUROCONTROL Network Management policies/requirements. See Draft AIP Changes (Appendix 1) and RSAD (Appendix 29)
i	The proposed airspace classification with justification for that classification	All proposed additional CAS adopts existing airspace classification. See Section 5.4.3 and Draft AIP Changes (Appendix 1)
j	Demonstration of commitment to provide airspace users equitable access to the airspace as per the classification and where necessary indicate resources to be applied or a commitment to provide them in line with forecast traffic growth. 'Management by exclusion' would not be acceptable	All proposed additional CAS adopts existing airspace classification. See Section 5.4.3 and Draft AIP Changes (Appendix 1). Extensive stakeholder engagement with users of the airspace (GA, airports, airlines, military) has been evidenced. See Engagement Evidence (Appendix 35)
k	Details of and justification for any delegation of ATS	No change to delegation outside of UK airspace. Draft AIP Changes (Appendix 1)

9. Safety Assessment

9.1 Introduction

9.1.1 The following text covers both ACPs for LD1.1 and FRA D2, which in combination are referred to as the West Airspace Deployment (West) Project.

9.1.2 Due to the size and nature of the West changes NATS has a dedicated Safety Manager and a Human Factors Specialist. Their roles are to manage the safety assessment of each aspect of the airspace changes, to ensure that the NATS CAA-compliant Safety Management System is followed. Also, their role is to submit safety arguments, with supporting evidence, to the CAA to clearly demonstrate each airspace change is at least tolerably safe for implementation and that appropriate assurances are in place.

9.1.3 The sections below outline the results of the complete and pending safety and human performance assurance related activities / deliverables in chronological order.

9.2 Safety Plan (6203/PHA/01 | Issue 2)

9.2.1 This plan defines the Safety assurance activities that will be performed, and the deliverables produced through to post implementation assurance monitoring.

9.3 West Airspace Deployment Human Performance Plan

9.3.1 This plan defines the Human Performance assurance activities to be performed, and the deliverables to be produced through to post implementation assurance monitoring.

9.4 Key Assurance Risks (KARs)

9.4.1 These were identified early in the project to provide opportunity to mitigate potential impacts on project assurance. These involved suitable stakeholder representation and will be managed to completion in the CAR (Change Assurance Report). See below for an overview of the CAR.

9.5 Human Performance Description

9.5.1 This document sets out the full understanding of the various expected impacts on Human Performance resulting from the planned changes of the WEST project. Performance implications as well as design characteristics associated with Roles, Tasks and Systems have been investigated to identify the key impacts for which solutions may need to be developed as mitigations.

9.6 Validation Simulations (ValSims) Report

9.6.1 The ValSims were completed early April 2022. The output from this informed the following assurance activities.

9.7 Michelangelo Assessment

9.7.1 The Michelangelo Assessment can be provided on request. This document indicates that there will be a negligible safety impact across the affected sectors, Swanwick AC and NATS En Route ATM.

9.8 HAZID (Hazard Identification)

9.8.1 The HAZID report incorporates a Procedure Hazard Identification (PHI) and a Procedure Hazard Analysis (PHA). The HAZID presents all of the detailed analysis of the changes covered by this ACP to determine the level of safety risk associated with them.

9.8.2 In summary, all applicable Hazards have been assessed, and the level of safety risk is tolerable.

9.9 Airspace Safety Review (ASR)

9.9.1 The ASR is due to take place in Oct 2022 taking cognisance of the output from the published Validation Sims and HAZID reports.

9.10 CAR (Change Assurance Report) and Human Factors Assurance Report (HFAR)

9.10.1 The development of these documents will be directly coordinated between SARG and NATS. These documents must be signed off by all key stakeholders more than 30 days prior to the introduction of the change. These documents are technical in nature and are designed to be read by experts in the field of aviation safety with full contextual awareness of the contents. These documents are confidential and would not be published as part of the airspace change process.

9.11 Conclusion

9.11.1 The safety and human performance assessments undertaken to date indicate that nothing is presently foreseen that will impact on the maintenance of the existing level of safety performance demonstrated within the current operation.

10. Operational Impact

	An analysis of the impact of the change on all airspace users, airfields and traffic levels must be provided, and include an outline concept of operations describing how operations within the new airspace will be managed. Specifically, consideration should be given to:	Evidence of compliance/ proposed mitigation
a	Impact on IFR general air traffic and operational air traffic or on VFR General Aviation (GA) traffic flow in or through the area	See Draft AIP Changes (Appendix 1) for changes associated to IFR general air traffic. See Section 6.3 for impacts to IFR traffic. Net reduction in CAS of ~108NM^3. See Section 5.4 and Section 6.3 and Full Options Appraisal (Ref 20) for impact on VFR traffic
b	Impact on VFR operations (including VFR routes where applicable)	There are proposed amendments to CAS, see Section 5.4. Overall, there is a positive impact to VFR traffic due to the reclassification of ~ 108NM^3 of CAS to Class G. See Section 6.3 and Full Options Appraisal (Ref 20) for impact on VFR traffic
c	Consequential effects on procedures and capacity, i.e. on SIDs, STARs, and/or holding patterns. Details of existing or planned routes and holds	For effects on capacity see Section 6 and Final Options Appraisal (Ref 20). For details of procedures see Section 5 and Draft AIP Changes (Appendix 1). For effects on procedures see section 6 and Procedure Design Report (Appendix 36)
d	Impact on aerodromes and other specific activities within or adjacent to the proposed airspace	For details see Section 5 and for impacts see Section 6
e	Any flight planning restrictions and/or route requirements	Flight planning restrictions will be managed in the RAD and are therefore out of scope of the CAP1616 process. See Section 6

11. Supporting Infrastructure/ Resources

	General requirements	Evidence of compliance/ proposed mitigation
a	Evidence to support RNAV and conventional navigation as appropriate with details of planned availability and contingency procedures	See Draft AIP Changes (Appendix 1)
b	Evidence to support primary and secondary surveillance radar (SSR) with details of planned availability and contingency procedures	Traffic uses the same regions as today in a similar manner from a surveillance point of view. Demonstrably adequate for the region
c	Evidence of communications infrastructure including R/T coverage, with availability and contingency procedures	Traffic uses the same regions as today in a similar manner from a comms infrastructure point of view. Demonstrably adequate for the region. Contingency arrangements detailed in LOAs (Appendices 3-27).
d	The effects of failure of equipment, procedures and/or personnel with respect to the overall management of the airspace must be considered	Existing contingency procedures have been reviewed and management protocol will continue to apply as today. See Appendices 3-27
e	Effective responses to the failure modes that will enable the functions associated with airspace to be carried out including details of navigation aid coverage, unit personnel levels, separation standards and the design of the airspace in respect of existing international standards or guidance material	As above (11d)
f	A clear statement on SSR code assignment requirements	No change to SSR code allocation
g	Evidence of sufficient numbers of suitably qualified staff required to provide air traffic services following the implementation of a change	See Stage 4 Final Options Appraisal (Ref 20) where we described the need to train ~ 120-150 NATS controllers, and ~ 50 support staff, presuming the approval and implementation of this proposal. This training will be complete in good time for the planned implementation date and in accordance with CAA requirements for commencement and completion of training

12. Airspace and Infrastructure

	General requirements	Evidence of compliance/ proposed mitigation
a	The airspace structure must be of sufficient dimensions with regard to expected aircraft navigation performance and manoeuvrability to fully contain horizontal and vertical flight activity in both radar and non-radar environments	LD1.1 is wholly contained within controlled Airspace. The airspace structure is of sufficient dimensions. See Section 5.4 and Draft AIP Changes (Appendix 1) and RSAD (Appendix 29)
b	Where an additional airspace structure is required for radar control purposes, the dimensions shall be such that radar control manoeuvres can be contained within the structure, allowing a safety buffer. This safety buffer shall be in accordance with agreed parameters as set down in CAA policy statement 'Safety Buffer Policy for Airspace Design Purposes Segregated Airspace'. Describe how the safety buffer is applied, show how the safety buffer is portrayed to the relevant parties, and provide the required agreements between the relevant ANSPs/ airspace users detailing procedures on how the airspace will be used. This may be in the form of Letters of Agreement with the appropriate level of diagrammatic explanatory detail.	Additional structures are required for radar control purposes. See Draft AIP Changes (Appendix 1). Radar control manoeuvres for containment – see RSAD (Appendix 28). NATS is seeking dispensation from the Safety Buffer Policy. See Section 5.14 and HAZID Report (Appendix 32)
c	The Air Traffic Management system must be adequate to ensure that prescribed separation can be maintained between aircraft within the airspace structure and safe management of interfaces with other airspace structures	There will be no change to the ATM system used
d	Air traffic control procedures are to ensure required separation between traffic inside a new airspace structure and traffic within existing adjacent or other new airspace structures	Any changes to ATC procedures will follow the SP406 APSA process which will be submitted to the CAA 30 days prior to implementation
e	Within the constraints of safety and efficiency, the airspace classification should permit access to as many classes of user as practicable	As today - no proposed changes to existing airspace classifications. See Section 5.4.3 and Draft AIP Changes (Appendix 1)
f	There must be assurance, as far as practicable, against unauthorised incursions. This is usually done through the classification and promulgation	See HAZID report (Appendix 32)
g	Pilots shall be notified of any failure of navigational facilities and of any suitable alternative facilities available and the method of identifying failure and notification should be specified	Existing contingency procedures would continue to apply
h	The notification of the implementation of new airspace structures or withdrawal of redundant airspace structures shall be adequate to allow interested parties sufficient time to comply with user requirements. This is normally done through the AIRAC cycle	This change will be promulgated with a double AIRAC cycle, in line with EUROCONTROL guidance
i	There must be sufficient R/T coverage to support the Air Traffic Management system within the totality of proposed controlled airspace	Traffic uses the same regions as today in a similar manner from a comms infrastructure point of view. Demonstrably adequate for the region. See Air Ground Air Radio Coverage Assessment (Appendix 31)

	General requirements	Evidence of compliance/ proposed mitigation
j	If the new structure lies close to another airspace structure or overlaps an associated airspace structure, the need for operating agreements shall be considered	Substantial engagement with relevant parties has taken place. LOAs are revised accordingly. See Draft LoAs (Appendices 3-27)
k	Should there be any other aviation activity (low flying, gliding, parachuting, microlight site, etc.) in the vicinity of the new airspace structure and no suitable operating agreements or air traffic control procedures can be devised, the change sponsor shall act to resolve any conflicting interests	LOAs and ATC procedures are in place following extensive engagement. See Draft LoAs (Appendices 3-27)

	ATS route requirements	Evidence of compliance/ proposed mitigation
a	There must be sufficient accurate navigational guidance based on in-line VOR/DME or NDB or by approved RNAV derived sources, to contain the aircraft within the route to the published RNP value in accordance with ICAO/ EUROCONTROL standards	See Aerodata spreadsheet (Appendix 2) and RNAV1 Coverage Assessment (Appendix 33)
b	Where ATS routes adjoin terminal airspace there shall be suitable link routes as necessary for the ATM task	See Section 5. This has been assessed during engagement and validation simulations. See Validation Simulation Report (Appendix 28) and RSAD (Appendix 29)
c	All new routes should be designed to accommodate P-RNAV navigational requirements	See Aerodata spreadsheet (Appendix 2) and RNAV1 Coverage Assessment (Appendix 33)

	Terminal airspace requirements	Evidence of compliance/ proposed mitigation
	Changes to link with proposed terminal structures are described in Appendix 1	

	Off-route airspace requirements	Evidence of compliance/ proposed mitigation
	See LOAs (Appendices 3-27)	

13. Environmental Assessment

	Theme	Content	Evidence of compliance/ proposed mitigation
a	WebTAG analysis	Output and conclusions of the analysis (if not already provided elsewhere in the proposal)	See Stage 4 Final Options Appraisal (Ref 20) and WebTag Excel file
b	Assessment of noise impacts (Level 1/M1 proposals only)	Consideration of noise impacts, and where appropriate the related qualitative and/or quantitative analysis If the change sponsor expects that there will be no noise impacts, the rationale must be explained	N/A – environmental analysis requirements scaled equivalent to a Level 2 change
c	Assessment of CO_2e emissions	Consideration of the impacts on CO_2e emissions, and where appropriate the related qualitative and/or quantitative analysis If the change sponsor expects that there will be no impact on CO_2e emissions impacts, the rationale must be explained	See Net Impacts Summary, Section 6.2
d	Assessment of local air quality (Level 1/M1 proposals only)	Consideration of the impacts on local air quality, and where appropriate the related qualitative and/or quantitative analysis If the change sponsor expects that there will be no impact on local air quality, the rationale must be explained	N/A – environmental analysis requirements scaled equivalent to a Level 2 change
e	Assessment of impacts upon tranquillity (Level 1/M1 proposals only)	Consideration of any impact upon tranquillity, notably on Areas of Outstanding Natural Beauty or National Parks, and where appropriate the related qualitative and/or quantitative analysis If the change sponsor expects that there will be no tranquillity impacts, the rationale must be explained	N/A – environmental analysis requirements scaled equivalent to a Level 2 change
f	Operational diagrams	Any operational diagrams that have been used in the consultation to illustrate and aid understanding of environmental impacts must be provided	N/A, no diagrams were used to illustrate environmental impacts
g	Traffic forecasts	10-year traffic forecasts, from the anticipated date of implementation, must be provided (if not already provided elsewhere in the proposal)	See Final Options Appraisal (Ref 20)
h	Summary of environmental impacts and conclusions	A summary of all the environmental impacts detailed above plus the change sponsor's conclusions on those impacts	See Net Impacts Summary, Section 6.2

14. Reversion Statement

14.1 The introduction of a new large scale ATS routes structure as proposed would permanently and significantly change the airspace structure, hence making reversion complex and extremely difficult.

14.2 In the unlikely event that there are unexpected issues caused by this proposal, then short notice changes could be made via NOTAM or by adding RAD restrictions.

14.3 For a permanent reversion, the changes would have to be reversed by incorporating this into an appropriate future AIRAC date. Due to the limitations of NATS Area System (NAS - flight and radar data processing) large scale airspace changes are only implemented four times a year.

15. Index of Appendices: Supporting & Technical Documentation

15.1 The following technical documents provide further information on the proposed design and/or evidence of engagement activity.

15.2 Those marked NO PUBLISH will not be available publicly due to:

- containing personal information
- legitimate commercial interests that would be harmed if published
- or information on critical national infrastructure that cannot be placed in the public domain

They will be supplied to the CAA for their eyes only.

No.	Supplementary Document Title	Remarks
1	Draft AIP Changes	Published on portal
2	CAA Aeronautical Data Template	(NO PUBLISH)
3	Draft LOA Aberporth STU RCA-PTA	(NO PUBLISH)
4	Draft LoA Brest	(NO PUBLISH)
5	Draft LoA British Gliding Association (OSSEP)	(NO PUBLISH)
6	Draft LoA Castlemartin & Manorbier	(NO PUBLISH)
7	Draft LoA Cornwall Airport Newquay	(NO PUBLISH)
8	Draft LoA Exeter	(NO PUBLISH)
9	Draft LoA Hereford Garrison	(NO PUBLISH)
10	Draft LoA Hinton Skydiving Centre	(NO PUBLISH)
11	Draft LoA Jersey	(NO PUBLISH)
12	Draft LoA Lulworth Range	(NO PUBLISH)
13	Draft LoA MOD Pendine	(NO PUBLISH)
14	Draft LoA NATS BMFHQ ARU Status	(NO PUBLISH)
15	Draft LoA NATS, 78 Sqn(MIL) BGA Warton TRA(G)	(NO PUBLISH)
16	Draft LoA NATS BAE Warton RAF (U) Swanwick (AR)	(NO PUBLISH)
17	Draft LoA NATS HQ AIR, HQ Navy BAE Warton Co-ordination	(NO PUBLISH)
18	Draft LoA RAF Brize Norton ATSU	(NO PUBLISH)
19	Draft LoA RAF Valley MOD Aberporth	(NO PUBLISH)
20	Draft LoA RAF (U) HQAir SWMDA	(NO PUBLISH)
21	Draft LoA RNAS Yeovilton	(NO PUBLISH)
22	Draft LoA Salisbury Plain	(NO PUBLISH)
23	Draft LoA Severn Group	(NO PUBLISH)
24	Draft LoA Shannon	(NO PUBLISH)
25	Draft LoA Skydive Buzz Dunkeswell	(NO PUBLISH)
26	Draft LoA Dublin	(NO PUBLISH)
27	Draft LoA Oxford Airport	(NO PUBLISH)

28	Validation Simulation Report Summary	Supplied separately (NO PUBLISH)
29	Route Separation Assurance Document RSAD	(NO PUBLISH)
30	DAP1917 Application for IFP Reg Approval: NATS	(NO PUBLISH)
31	Air Ground Air Radio Coverage Assessment	(NO PUBLISH)
32	HAZID Report	Supplied separately (NO PUBLISH)
33	RNAV1 (DME-DME) Coverage Assessment	(NO PUBLISH)
34	Surveillance Coverage Assessment	(NO PUBLISH)
35	Engagement evidence	Published on portal
36	Procedure Design Report	(NO PUBLISH)

16. Glossary

ACC	Area Control Centre (there are two ACCs in the UK, Swanwick and Prestwick)
ACP	Airspace Change Proposal
AIP	Aeronautical Information Publication (where airspace and route definitions are published)
AIRAC	Aeronautical Information Regulation And Control
AMC	Airspace Management Cell
AMS	CAA Airspace Modernisation Strategy (CAP 1711)
ANSP	Airspace Navigation Service Provider
ASR	Airspace Safety Review
ATC	Air Traffic Control
ATS	Air Traffic Services
B2B	Business to Business
BGA	British Gliding Association
BHA	British Helicopter Association
Borealis Alliance	Alliance amongst north-west European Air Navigation Service Providers to drive better performance for stakeholders through business collaboration. The Alliance includes the ANSPs of Denmark, Estonia, Finland, Iceland, Ireland, Latvia, Norway, Sweden and the UK.
CAA	The UK Civil Aviation Authority
CACD	Central Airspace and Capacity Database
CAP	Civil Aviation Publication (publications produced by the CAA)
CAR	Change Assurance Report
CAS	Controlled Airspace
CFSP	Computer Flight Plan Service Providers
COP	Co-ordination Point
CTA	Control Area
CTR	Controlled Traffic Region
DAATM	Defence Airspace and Air Traffic Management
DCT	(Direct) Waypoint to waypoint routing, which does not use an airway
DfT	Department for Transport
DSNA	Direction des Services de la Navigation Aérienne - French ANSP
ERNIP	European Route Network Improvement Plan

EUROCONTROL	European Organisation for the Safety of Air Navigation; with 41 members it seeks to achieve safe and seamless air traffic management across Europe.
FBZ	Flight Plan Buffer Zones – areas for flight planners to avoid, providing separation from Special Use Airspace
FIR	Flight Information Region
FL	Flight Level, the altitude reference which aircraft use at higher altitudes using standard pressure setting, essentially units of 100ft, i.e., FL255 equates approximately to 25,500ft.
FRA	Free Route Airspace
FUA	Flexible Use of Airspace
GAT	General Air Traffic
GHG	Greenhouse Gas
HAZID	Hazard Identification
HFAR	Human Factors Assurance Report
IAA	Irish Aviation Authority
ICAO	International Civil Aviation Organisation – an agency of the United Nations
IFPS	Integrated Initial Flight Plan Processing System
KAR	Key Assurance Risks
LAC	London Area Control
LAMP	London Airspace Modernisation Programme; established to redesign the airspace in and around the London TMA region, providing a more efficient airspace design, modernising the route structure and making better use of aircraft and ATC technologies
LMS	London Middle Sector
LoA	Letter of Agreement
LTC	London Terminal Control
LTMA	London Terminal Manoeuvring Area
LUS	London Upper Sector
MoD	Ministry of Defence
MTMA	Manchester Terminal Manoeuvring Area
NAT	North Atlantic Tracks
NATMAC	National Air Traffic Management Advisory Committee
NPZ	No Planning Zone
OAT	Operational Air Traffic

PBN	Performance Based Navigation – international requirements which standardise accuracy, safety and integrity for satellite navigation systems.
PHI	Procedure Hazard Identification
PHA	Procedure Hazard Analysis
QNH	Altimeter sub-scale setting to obtain elevation when on the ground.
RAD	Route Availability Document: contains the policies, procedures and descriptions for route and traffic orientation. Includes route network and free route airspace utilisation rules and availability.
SARG	Safety and Airspace Regulation Group
SID	Standard Instrument Departure
SME	Subject Matter Expert
SoN	Statement of Need
SRD	Standard Routing Document
SSR	Secondary Surveillance Radar
STAR	Standard Terminal Arrival Route
SUA	Special Use Airspace – areas designated for operations of a nature that limitations may be imposed on aircraft not participating in those operations (i.e., military training areas)
TMA	Terminal Manoeuvring Area
TRA	Temporary Reserved Areas
UIR	Upper Information Region