West Airspace Deployment L6203
ACP-2019-12

Free Route Airspace
Deployment 2

Step 4B: Submit:
Airspace Change Proposal

Roles

Action	Role	Date
Produced	Airspace Change Specialist Airspace and Future Operations	09/2022
Reviewed Approved	Airspace Implementation Manager (ATC Lead) Airspace and Future Operations	09/2022
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1.1	09/2022	2.12 updated with revised benefits data; 2.13 deleted Figure 8 updated to show BANBA CTA Section 5.7 FBZs- updated to provide further detail and methodology Table 3 updated to include additional FBZs D009B, D017 & D023 Section 5.8 NPZs - updated to provide further detail and rationale Section 6.1 Additional information added regards stakeholder consultation 6.3.5 & 6.3.6 additional information added regards stakeholder feedback Section 6 6.4.7& 6.4.8 and Table 5 updated with revised benefits data Section 6.6 updated with revised benefits data Appendix 21 and 22 additional LOAs added

References

Ref No	Description	Hyperlinks
1	Airspace Change Guidance (CAP1616)	Link
2	CAA Airspace Modernisation Strategy (CAP 1711)	Link
3	Commission Implementing Regulation (EU) No 716/2014 (PCP)	Link
4	Air Traffic Services Safety Requirements (CAP 670)	Link
5	Special Use Airspace - Safety Buffer Policy for Airspace Design Purposes	Link
6	London Airspace Modernisation Programme 2 (Deployment 1; LD1.1) (ACP-2017-70)	Link
7	EUROCONTROL ERNIP Part 1	Link
8	WebTAG spreadsheet and data inputs	
9	UK Aeronautical Information Publication	Link
10	Stage 1 Statement of Need	Link
11	Stage 1 Design Principles	Link
12	Stage 2 Design Options	Link
13	Stage 2 Design Principle Evaluation	Link
14	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	

Contents

1. Introduction

1.1 This ACP is sponsored by NATS and proposes the second deployment of FRA in UK airspace, across the southwest of England and most of Wales.

1.2 The concept of Free Route Airspace (FRA) where aircraft can fly between points and are not constrained to follow a network of routes is Initiative 2 of the CAA's Airspace Modernisation Strategy (AMS) (Ref 2).

1.3 The implementation of FRA by European Union (EU) member states was mandated in European law under the EU Implementing Regulation EU716/2014 (Pilot Common Project) (Ref 3), superseded by EU2021/116 (Common Project 1) within the EU. This change to the regulation occurred post-UK withdrawal from the EU. The DfT have consulted on if and how to incorporate this into UK law, at the time of writing, a decision has not been published. EU716/2014 is retained (and amended in UK domestic law) under the European Union (Withdrawal) Act 2018 (referred to as 'the mandate' throughout this document). Due to wider commitments (e.g. Borealis Alliance and the CAA AMS) and consistency of operation, NATS' intention is to introduce FRA throughout UK airspace regardless of the withdrawal of the United Kingdom from the European Union (EU). FRA implementation will align with the requirements of EU716/2014 until such time that it is superseded in UK law.

1.4 The change from a network of routes to FRA represents a significant change for aircraft operators and Air Traffic Control (ATC) and will enable the opportunity to flight plan across the airspace managed by Borealis Alliance member Air Navigation Service Providers (ANSPs) unconstrained by the route network in each ANSP's airspace.

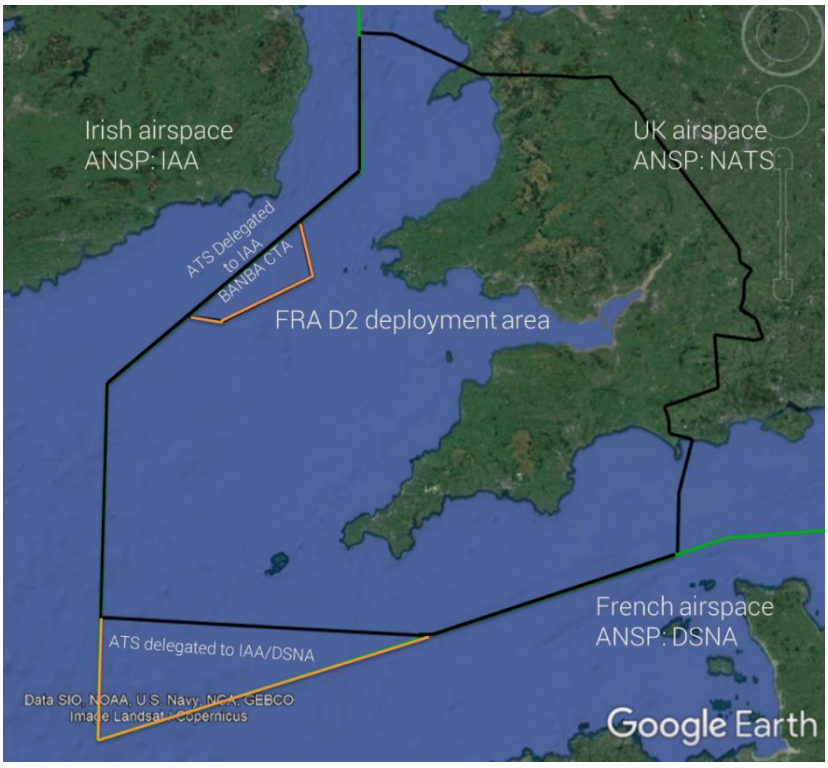


Figure 1 FRA D2 Deployment Area, adjoining FIRs and delegated ATS areas

1.5 The FRA project is split into individual geographical deployments which will introduce FRA throughout UK airspace in 4 deployments, each with an individual Airspace Change Proposal (ACP). A single ACP for FRA across all UK airspace would not be appropriate or easily align

with the engagement and consultation requirements of CAP1616, due to the planned phased introduction of FRA, and its interdependencies with other airspace change proposals.

1.6 This Airspace Change Proposal specifically addresses the second deployment (Deployment 2), across the southwest of England and most of Wales, as shown in Figure 1. The area inside the black outline is the FRA D2 deployment area. Remaining deployments will be addressed in subsequent ACPs.

1.7 NATS is undertaking this ACP to ensure it meets its legal obligations, as well as ensuring it conforms to the CAA's AMS requirements, whilst enabling airline operators to optimise their flight profiles.

1.8 In a separate ACP, NATS also proposes that the underlying airspace (airspace from 7000ft – 24,500ft) will be changed concurrently as part of the London Airspace Modernisation Programme 2 (Deployment 1; LD1.1) (ACP-2017-70, Ref 6).

1.9 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.

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

1.11 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, there would be no perceptible change to noise impacts to stakeholders on the ground, so no noise analysis has been conducted.

1.12 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-2019-12. The link to the CAA progress page is here.

2. Executive Summary

2.1 This implementation is in co-ordination with London Airspace Management Programme 2 Deployment 1.1, which proposes to change the airspace below the FRA D2 region between 7,000ft and 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 This proposed change has the following objectives:

- Fulfil legal mandate
- To conform to the CAA's AMS requirements
- Fulfil Borealis Alliance commitment of introduction of FRA and harmonise our upper airspace with that of our neighbouring states.
- Enable the reduction of CO_2e emissions and fuel burn per flight and conform to the DfT Air Navigation Guidance

2.3 Due to the altitude 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 FL245 and above.

2.5 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).

2.6 The upper airspace also accommodates flights arriving to the London FIR from the adjacent FIRs: Scottish, Irish, French (Brest) and the Channel Islands Control Zone as well as traffic departing from adjacent UK airspace, and overflights such as transatlantic flights to/from continental Europe.

2.7 At Stage 1 we developed Design Principles via engagement with targeted stakeholder groups (Ref 11).

2.8 At Stage 2 we developed design options, via further engagement with the same targeted stakeholders. We evaluated these against the Design Principles and developed 3 design options which were progressed to consultation (Ref 12, 13 & 14).

2.9 At Stage 3 we consulted with stakeholders (and any interested party) and following this we selected the final design, which is to implement FRA with all routes removed (Ref 15, 16,17 & 18).

2.10 It is proposed to implement FRA in Deployment 2 from FL245. This will affect all aspects of the airspace above this level including overflights, arrivals, departures, cross-border flights, and Special Use Airspace (SUAs) volumes. This document describes the proposed changes and provides examples. The impacts of the proposed changes are assessed and discussed.

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 2,171 tonnes of fuel in 2023 (value £2,097,460[1]), increasing to an annual saving of 2,585 tonnes of fuel in 2033 (value £2,497,436). This equates to 6,903 tonnes of CO_2e (2023) and 8,221 tonnes by 2033[2].

[1] This was based on the IATA jet fuel price of September 2022, at 1,110.49 USD per tonne converted to GBP at 0.87£/$ (£966 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

2.13 Due to these changes being in Upper Airspace there are no noise or other environmental impacts assessed.

Secretary of State Call-In

2.14 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 (Ref 1) 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 10,000 net 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.

2.15 The Secretary of State has provided statutory guidance on the meaning of these criteria. For FRA D2 NATS assess that none of these criteria apply.

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 due to the legal mandate to deliver FRA it is not considered as a viable option.

3.1 Structures and Routes

3.1.1 This proposal concerns the upper airspace in the area shown in Figure 1 and the route network contained within (FL245 and above) shown in Figure 2. The airspace is part of the London Upper Flight Information Region (UIR).

3.1.2 Traffic is comprised of aircraft arriving/departing UK airports whether originating from airports within the lateral boundary of the FRA D2 area, or airports outside the area, and overflights such as transatlantic flights to/from continental Europe.

3.1.3 Within the BANBA CTA, the provision of ATS is delegated to the IAA, however this area is within the scope of this proposal.

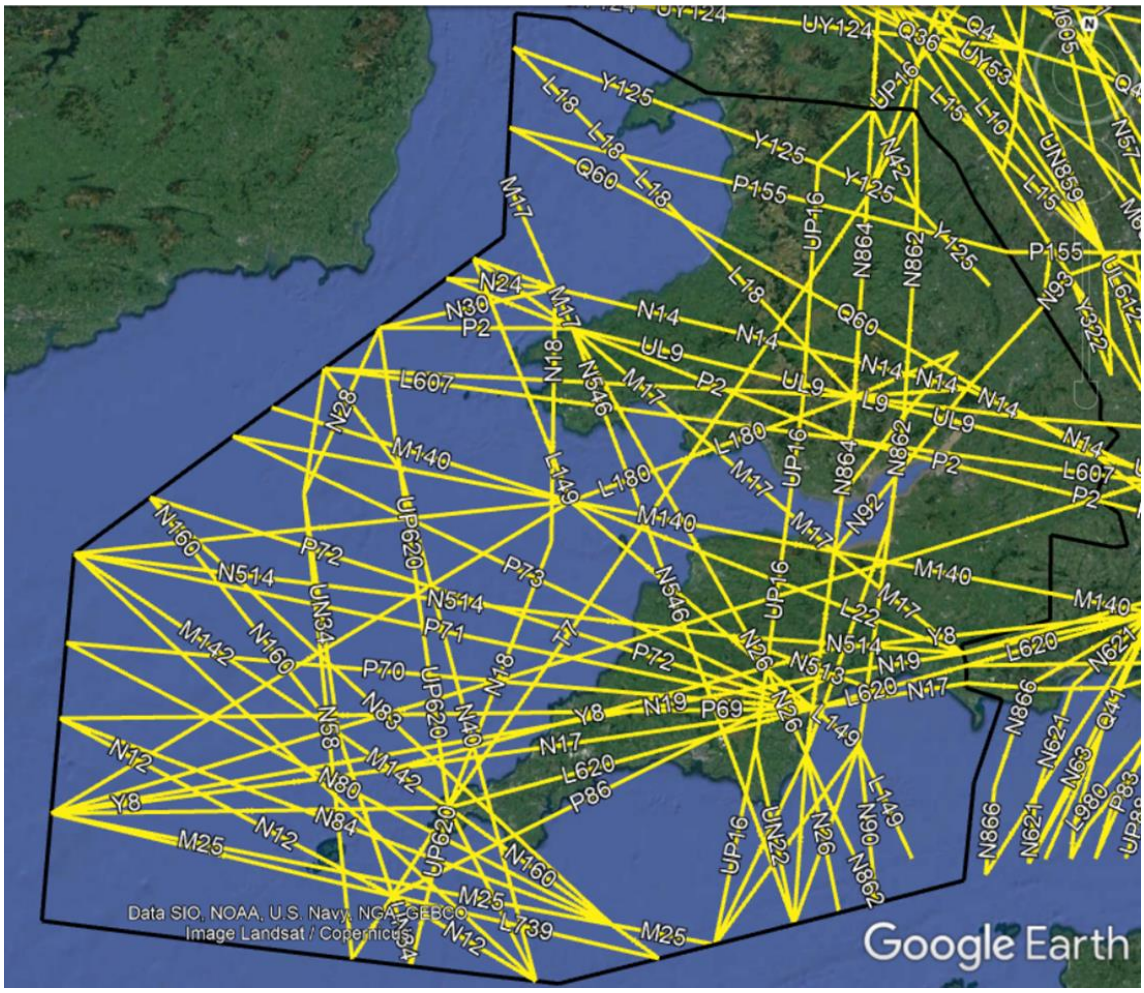


Figure 2 FRA Deployment Area, existing route structure

3.1.4 For reference, the extant UK route structure is defined in detail in this section of the UK Aeronautical Information Publication (AIP) ENR 3 ATS ROUTES (Ref 9).

3.2 Airspace Usage and proposed effect

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

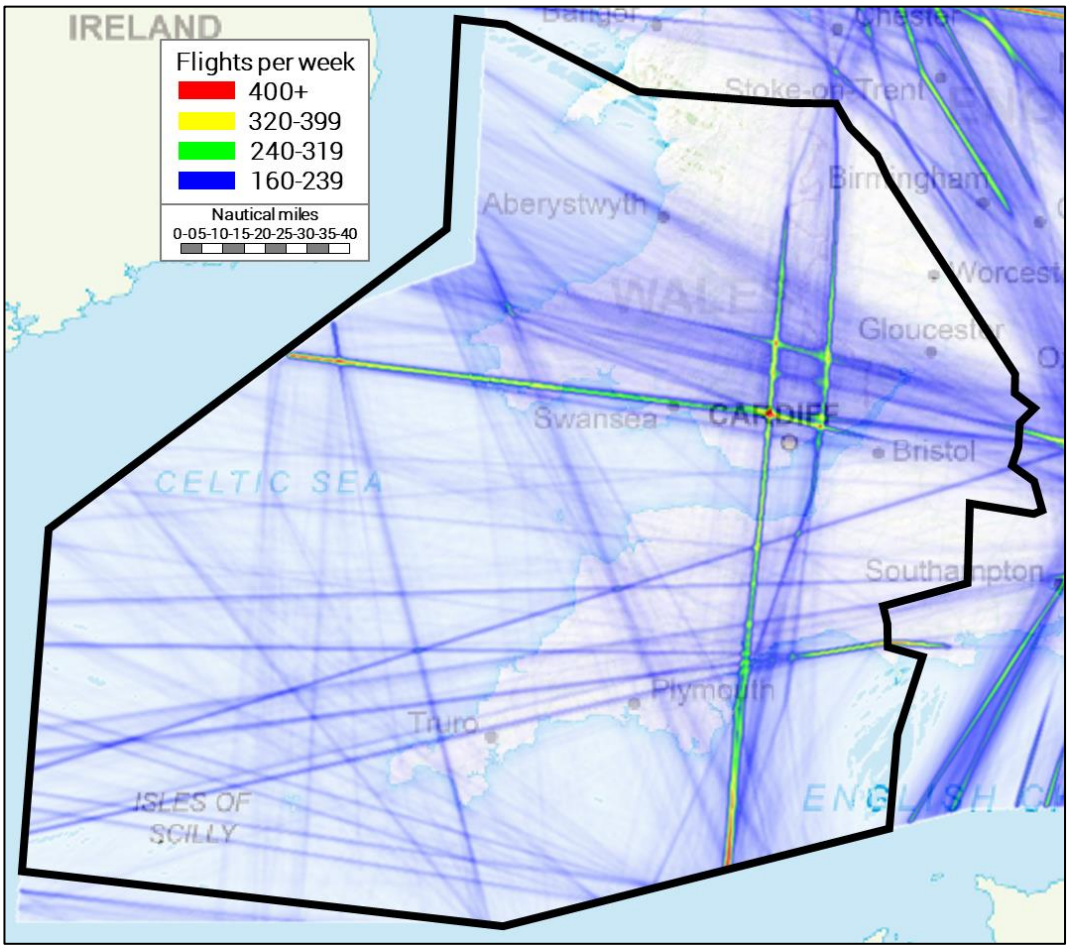


Figure 3 Flight Path Density Distribution

3.2.2 Currently all aircraft flight plan to fly along the published ATS route structure or on published Directs (DCTs) which are trajectories between specified waypoints. Modern satellite navigation now makes navigation between any points possible.

3.2.3 Air traffic control (ATC) routinely instruct aircraft to route direct to a point (termed a tactical direct), to improve efficiency as aircraft transit through UK airspace.

3.2.4 The use of the designated entry/exit points (termed co-ordination points (COPs)) at the UIR boundary, and the influence on flightpaths of some navigation beacons and the ATS route structure can be seen clearly in Figure 3. However, the regular use of tactical direct shortcuts to/from the COPs can also be discerned.

3.2.5 NATS has committed to introducing FRA in UK upper airspace to facilitate the harmonised Borealis Alliance volume of FRA. Borealis member ANSPs have committed to put in place a seamless and integrated FRA extending across national airspace boundaries, from the eastern boundary of the North Atlantic to the western boundary of Russian airspace in the North of Europe.

3.2.6 Within FRA, air traffic will be able to flight plan user preferred trajectories without reference to a route structure, therefore flows of traffic are able to change hour by hour, month by month and year by year in a manner which is not constrained by airspace design and is therefore less predictable.

3.2.7 Short- and long-term factors which can have an influence on the routings chosen by aircraft operators include:

Short Term Factors

- weather/winds (jet stream position),
- industrial action,
- events such as large sporting events (e.g. football matches, Olympics etc),
- military activity,
- ATC traffic regulations (used to manage flows).

Long Term Factors

- relative route charges between neighbouring countries,
- fuel prices,
- company business models/ fleet mix,
- seasonal route preferences,
- changing destinations and emerging markets,
- political factors,
- tourism preferences/marketing/fashion.

3.2.8 The proposed effect will enable environmental efficiencies in the form of CO_2e reduction and economic efficiencies in terms of fuel burn reduction. FRA is being implemented throughout European airspace and is already in operation in several neighbouring states. The introduction of FRA in UK airspace will ensure that the UK upper airspace is consistent with that of neighbouring states, enabling cross-border free routing.

3.3 Operational efficiency, complexity, delays and choke points

3.3.1 There are no specific issues relating to operational efficiency, complexity, delays or choke points associated with any of the routes or structures related to this airspace change proposal, other than a choke point at SALCO.

3.3.2 The EUROCONTROL Network Manager (NM) 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 LD1.1 ACP, seeks to rectify this network issue and provide a more efficient interface.

3.4 Safety issues

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

3.4.2 Ensuring the safety of the proposed changes is a priority for NATS. NATS has a dedicated safety manager for the FRA 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 FRA Programme, who ensures that any potential impact on human performance is assessed and mitigated as far as practically possible, as part of the Human Performance 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 (Ref 10) submitted in February 2019 is as follows:

In response to SESAR PCP Implementing Regulation EU716/2014, NATS intends to implement Free Route Airspace (FRA) in a phased manner across UK airspace. The SESAR PCP ATM Functionality 3 (AF3) states that Free Route shall be provided and operated in the airspace for which the Member States are responsible at and above flight level 310 in the ICAO EUR region by 1st January 2022. This ACP proposes the introduction of the second deployment of FRA across the Swanwick West Sector Group (which covers most of Wales and the southwest of England) in order to comply with this Implementing Regulation within the required timescale.

4.2 This ACP forms part of the modular, phased deployment of Free Route Airspace across the UK FIR. The overall programme is referred to as the Free Route Airspace (FRA) programme. This ACP relates to the second deployment, and is called 'Free Route Airspace, Deployment 2' (FRA D2).

5. Proposed Airspace Description

5.1 Objectives/ requirements for Proposed Design

5.1.1 The implementation of FRA within the UK has four key objectives and associated requirements:

Objective 1: Fulfil legal mandate (Implementing Regulation EU716/2014)

The implementation of FRA by European Union (EU) member states was mandated in European law under the EU Implementing Regulation EU716/2014 (Pilot Common Project) (see Para 1.3).

The mandated PCP requirements which have influenced the Design Options are:

- PCP Requirement 1: Free Route may be deployed both through the use of Direct Routing Airspace and through FRA.
- PCP Requirement 2: To facilitate early implementation before the target deployment date, free route could be implemented in a limited way during defined periods.
- PCP Requirement 3: Procedures for transitioning between free route and fixed route operations shall be set.
- PCP Requirement 4: Initial implementation of Free Route may be done on a structurally limited basis, for example by restricting the available entry/exit points for certain traffic flows, through the publication of DCTs, which will allow airspace users to flight plan on the basis of these published DCTs.
- PCP Requirement 5: DCT availability may be subject to traffic demand and/or time constraints.
- PCP Requirement 6: Free Route shall be provided and operated in the airspace for which the Member States are responsible at and above Flight Level 310 in the ICAO EUR region.
- PCP Requirement 7: Network Manager, air navigation service providers and airspace users shall operate:
  - DCT as from 1 January 2018.
  - FRA as from 1 January 2022.
- PCP Requirement 8: Flight planned trajectories will need to be managed to maintain a safe distance from SUA.
- PCP Requirement 9: Cross Border FRA.

The implications and influence of these requirements on the design options is discussed in full in the Stage 2 Design Options and Options Appraisal documents (Ref 12, 13 & 14).

Objective 2: To conform to the CAA's AMS requirements (Ref 2).

The CAA's AMS CAP1711 (Ref 2) is the UK's strategy for modernising the air navigation infrastructure. Sections 4.5-4.11 of the AMS refer specifically to FRA as a means for improving efficiency in the upper airspace. Hence this ACP is in support of the AMS requirements.

Objective 3: Fulfil Borealis Alliance commitment of introduction of FRA and harmonise our upper airspace with that of our neighbouring states.

NATS has committed to participate in the Borealis Alliance FRA Programme. Borealis Alliance members[3] have committed to put in place a seamless and integrated FRA extending across national airspace boundaries from the eastern boundary of the North Atlantic to the western boundary of Russian airspace in the North of Europe.

The intention of the cross-border FRA concept is to introduce continuous FRA operations at ANSP interfaces, in accordance with the EUROCONTROL European Route Network Implementation Plan (ERNIP Part 1) (Ref 7) and North Atlantic Documents e.g. ICAO EU Doc 7030.

This concept will provide the possibility for airspace users to flight plan a preferred trajectory, regardless of national FIR boundaries, and portions of airspace within which ATS is delegated to the participating states. This will allow flight plannable free routing from the North Atlantic to the Russian Border.

The Borealis Alliance membership have worked cooperatively over many years to develop a common FRA concept of operations as outlined in the Borealis Free Route Airspace Concept of Operations.

Objective 4: Enable the reduction of CO_2e emissions and fuel burn per flight and conform to the DfT Air Navigation Guidance

FRA is expected to facilitate flight planning and CO_2e/fuel benefits which will contribute to delivering the initiatives of the UK Airspace Modernisation Strategy (AMS).

5.2 Proposed New Airspace/ Route Definition and Usage

5.2.1 FRA is defined as "A specified airspace within which users may freely plan a route between a defined entry point and a defined exit point, with the possibility to route via intermediate (published or unpublished[4]) waypoints, without reference to the ATS route network, subject to airspace availability."

5.2.2 Waypoints can be assigned as one or more FRA significant points depending on their intended use as follows:

- FRA Entry Point (E) A published Significant Point on the horizontal boundary of the FRA from which FRA operations are allowed.
- FRA Exit Point (X) A published Significant Point on the horizontal boundary of the FRA to which FRA operations are allowed.
- FRA Point (I) A published Significant Point via which FRA operations are allowed.
- FRA Arrival Point (A) A published Significant Point to which FRA operations are allowed for arriving traffic to specific aerodromes.
- FRA Departure Point (D) A published Significant Point from which FRA operations are allowed for departing traffic from specific aerodromes.

5.2.3 In the D2 area the FRA concept of operations will extend from FL245 and above which is the established division between upper and lower airspace and the base of the London Upper CTA.

[3] Avinor (Norway), EANS (Estonia), Fintraffic ANS (Finland), IAA (Ireland), ISAVIA (Iceland), LGS (Latvia), LFV (Sweden), NATS (UK), Naviair (Denmark)

[4] FRA D2 will initially be deployed on legacy Flight Data Processing system which is unable to accommodate FRA flight plans which include unpublished waypoints.

5.2.4 All routes will be removed in the FRA area. Where flow management is regularly required in a specific volume of airspace (for example between Danger Areas) or in areas of complex traffic flows, then structural limitations may be used to manage traffic flows and capacity.

5.2.5 The proposed changes are all-encompassing for this airspace, and will affect:

- Overflights (See paragraph 5.3)
- Arrivals (See paragraph 5.4)
- Departures (See paragraph 5.5)
- Cross-border flights (See paragraph 5.6)
- Areas of Special Use Airspace (See paragraph 0)
- Areas of airspace with specific requirements (No Planning Zones) (See paragraph 5.8)

5.2.6 This section describes the FRA concept for each of these aspects, using examples to demonstrate the proposed changes and concept.

5.2.7 The draft AIP document (Appendix 1) details all the AIP changes proposed, including required route removals, introduction of Free Route volume, flight plan buffer zones, required amendments to en-route charts, SUA and FRA significant points.

5.2.8 Further detail depicting the placement of arrival and departure connecting points associated to individual airports is provided in Appendix 2.

5.2.9 A table of the supporting technical documents is provided in Section 15.

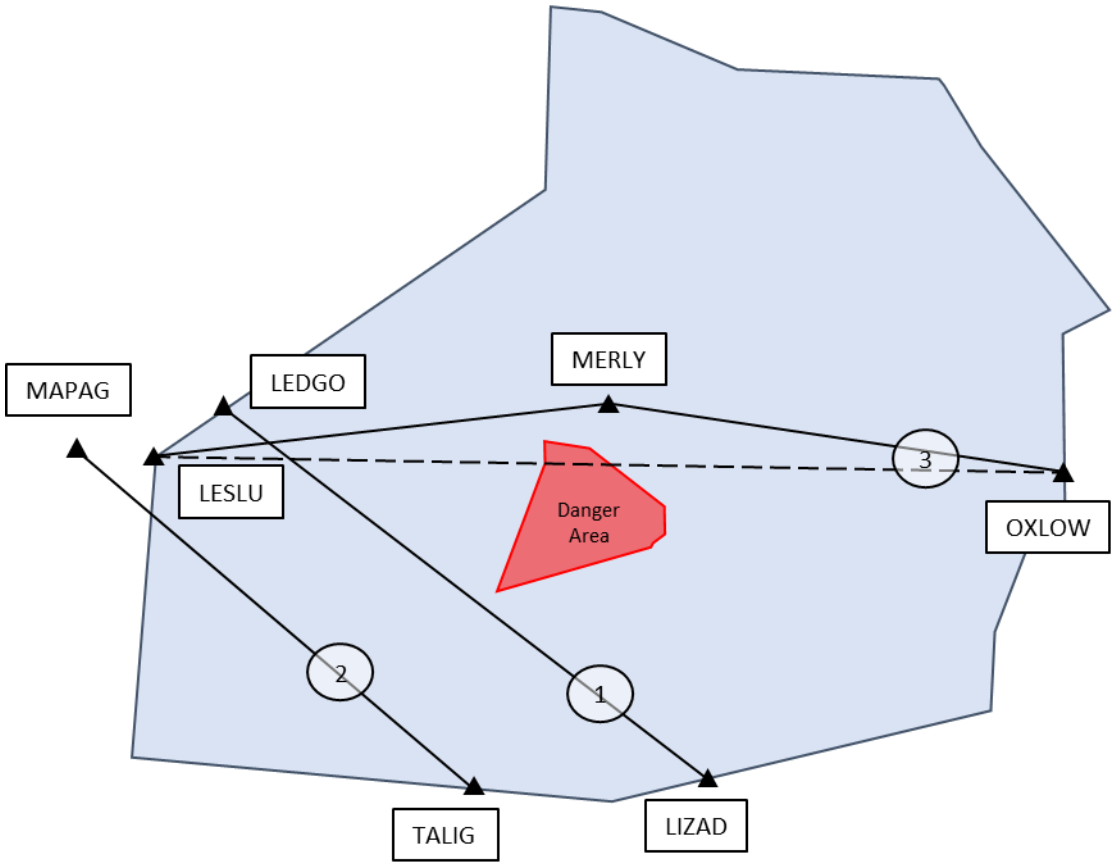
5.3 Overflights

5.3.1 Figure 4 overleaf shows examples of flight plans transiting the blue FRA area. These range from:

(1) Transit between a FRA E point and a FRA X point on the UIR boundary (e.g. LIZAD-LEDGO) with no intermediate points in between.

(2) Transit between a FRA E point on the UIR boundary (TALIG) to a point outside UK airspace (MAPAG) (Cross border FRA).

(3) Example of a flight plan which would not be permitted would be OXLOW–LESLU since it would transit a volume of active segregated Special Use Airspace (SUA) or associated Flight plan Buffer Zone (FBZ). For this to be accepted it would have to route via a FRA I point to take it around the SUA (e.g. an existing waypoint MERLY).



Source: EUROCONTROL FRA Guidelines

Figure 4 Examples of transiting flight plans.

5.4 Arrivals

5.4.1 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].

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

5.4.3 The design changes proposed in LD1.1 ACP maintains connectivity between the lower ATS routes and existing STARs, and this is described in the LD1.1 ACP (Ref 6) Interface sections, along with any STAR amendments.

5.4.4 The FRA arrival connecting points for all airports affected by the FRA D2 area are detailed in the draft AIP (Appendix 1). When FRA is deployed these will be published in the RAD Appendix

5.4.5 Figure 5 shows an example of the proposed arrival structure at Cardiff Airport[6], as detailed in Table 1.

[5] This is in accordance with EUROCONTROL FRA Guidance in ERNIP Part 1 Section 10 (Ref 7) which describes FRA arrival connectivity.

[6] Appendix 2 presents a table of all Arrival structures for all airports affected. It is not proportionate to present diagrams for each.

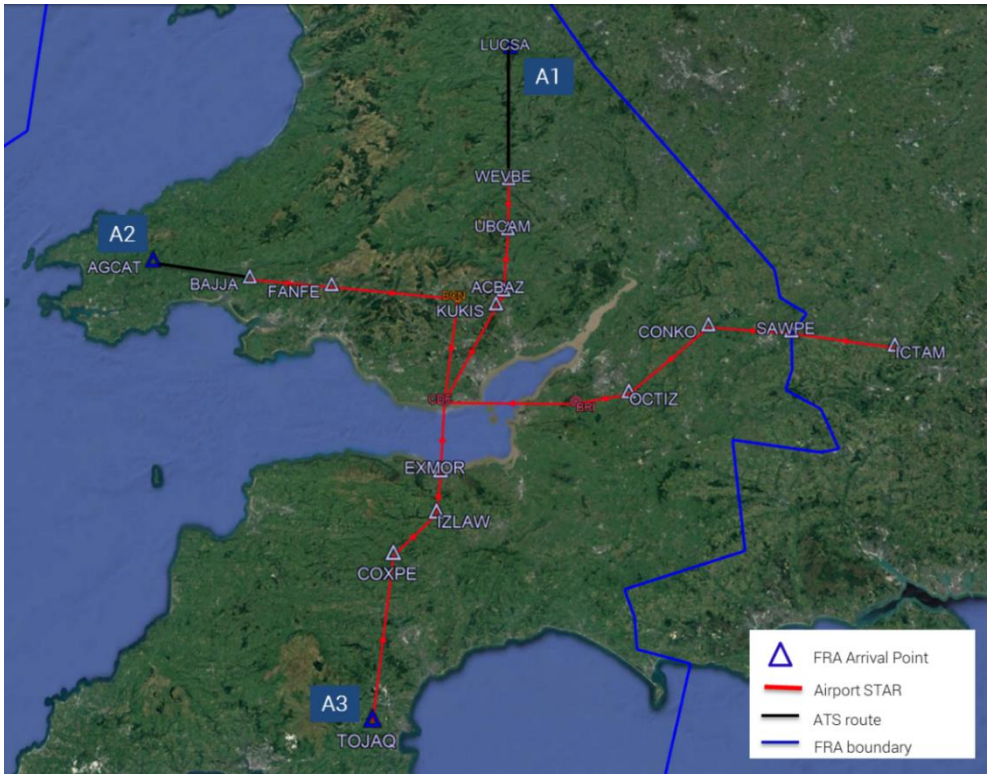


Figure 5 Proposed Arrival Structure – Cardiff Airport

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

Table 1 Examples of Arrival Connecting Points and links to lower ATS route structure – Cardiff Airport

5.5 Departures

5.5.1 Each airport will have a defined set of points for departures (FRA Departure points) to 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 proposed in LD1.1 ACP (Ref 6) and described in LD1.1 Interface sections).

5.5.2 The FASI airports within the FRA D2 footprint are Cardiff, Bristol and Exeter (only Cardiff and Bristol have SIDs).

5.5.3 The FRA departure connecting points for all airports affected by the FRA D2 area are detailed in the draft AIP (Appendix 1). When FRA is deployed these will be published in the RAD Appendix 5. Figure 6 shows an example of the proposed departure structure at Cardiff Airport[7], as detailed in Table 2.

[7] Appendix 2 presents a table of all Departure structures for all airports affected. It is not proportionate to present diagrams for each.

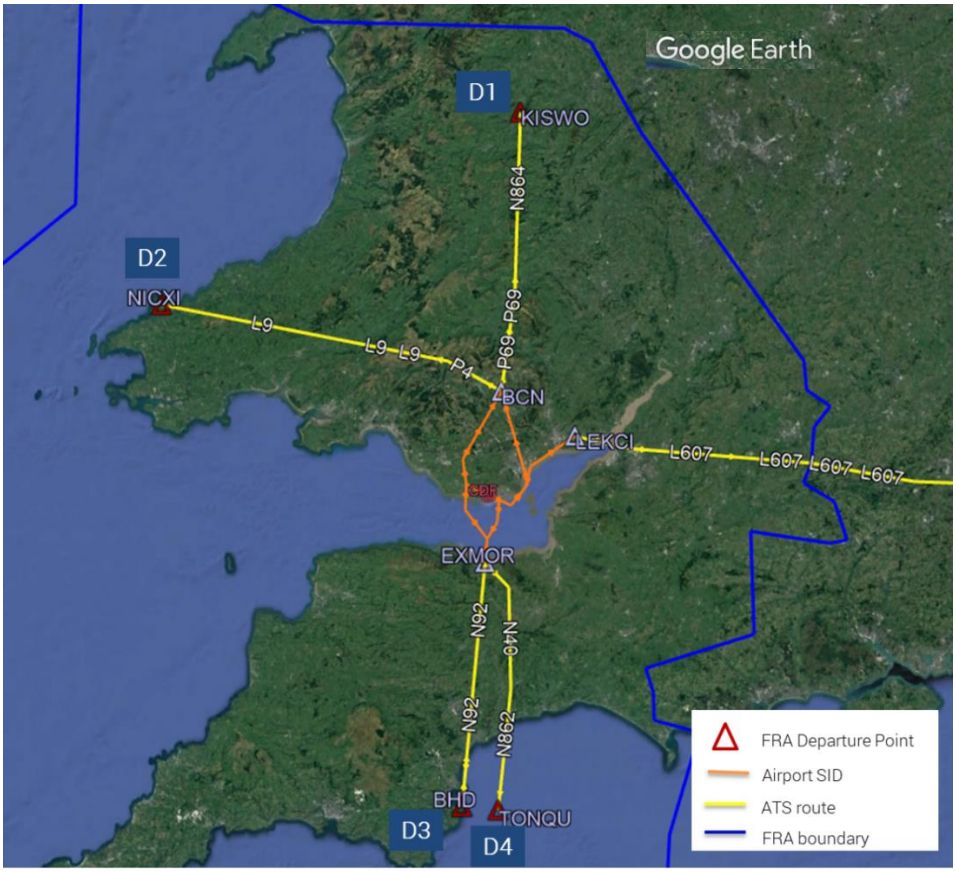


Figure 6 Proposed Departure Structure – Cardiff Airport

Airport	Direction	Departure Connecting 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 2 Examples of Departure Connecting Points and links to lower ATS route structure – Cardiff Airport

5.6 Cross Border FRA & Borealis Alliance

5.6.1 In addition to the introduction of Arrival and Departure Points for airfields, FRA also allows for the introduction of Cross Border operations i.e., the ability to flight plan to cross existing international airspace boundaries without the need to do so via a published Co-ordination Point (COP)[8].

5.6.2 The Borealis Alliance members have worked cooperatively since 2012 to develop a common FRA concept of operations as outlined in the Borealis Free Route Airspace Concept of Operations. Many of the design options discussed in the Stage 2 document set (Refs 12, 13 & 14) are related to and have been influenced by the engagement between Borealis Alliance members as well as other Stakeholders and Air Navigation Service Providers (ANSPs).

5.6.3 The intention of the cross-border FRA concept is to secure unconstrained cross-border FRA operations at the ANSP interfaces, in accordance with the EUROCONTROL European Route Network Implementation Plan (ERNIP Part 1) (Ref 7) and North Atlantic Documents e.g. ICAO Doc 7030. This concept will enable airspace users to flight plan a preferred trajectory, regardless of national FIR boundaries, and portions of airspace within which the provision of ATS is delegated to the participating states.

5.6.4 Figure 7 show the planned evolution of the Borealis FRA Airspace of which this proposal is a key step (source Borealis Alliance 2019).

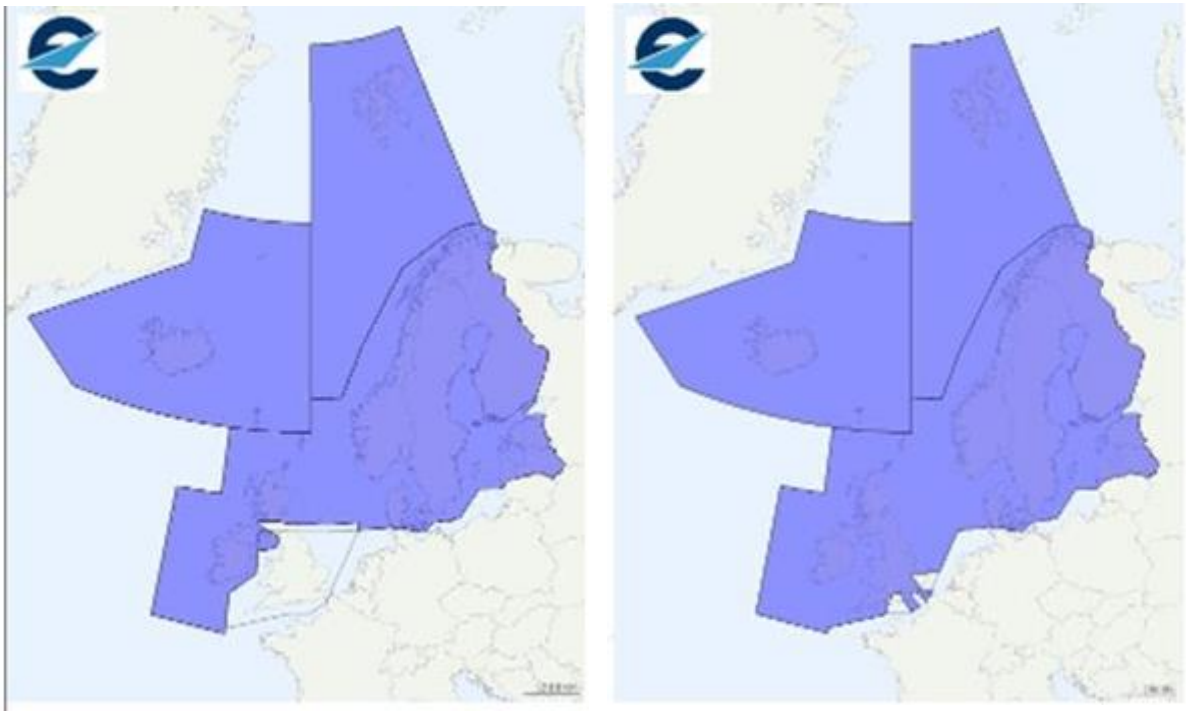


Figure 7 Current Borealis FRA Airspace (Left) and Planned Borealis FRA Airspace (Right)

5.6.5 In Figure 8 (overleaf) the sections of the borders where FRA exists within adjoining airspace are marked. Red lines indicate the lateral FRA border with the Irish UIR /Irish ACC (including BANBA CTA in which ATS has been delegated to IAA), published in the AIP as cross-border FRA. COPs will be designated as FRA intermediate points.

5.6.6 Orange lines indicate the lateral FRA border with Brest ACC, noting that the FRA boundary does not align to the UIR boundary where provision of ATS has been delegated to Brest and Shannon ACCs. This interface is not published as cross-border FRA due to system limitations. The COPs will be designated as FRA Entry and Exit points.

[8] Subject to structural limitations that may be required to manage traffic flows or system limitations.

5.6.7 Blue lines indicate the lateral FRA boundary within the UK UIR. FRA Entry and Exit points are designated in the AIP.

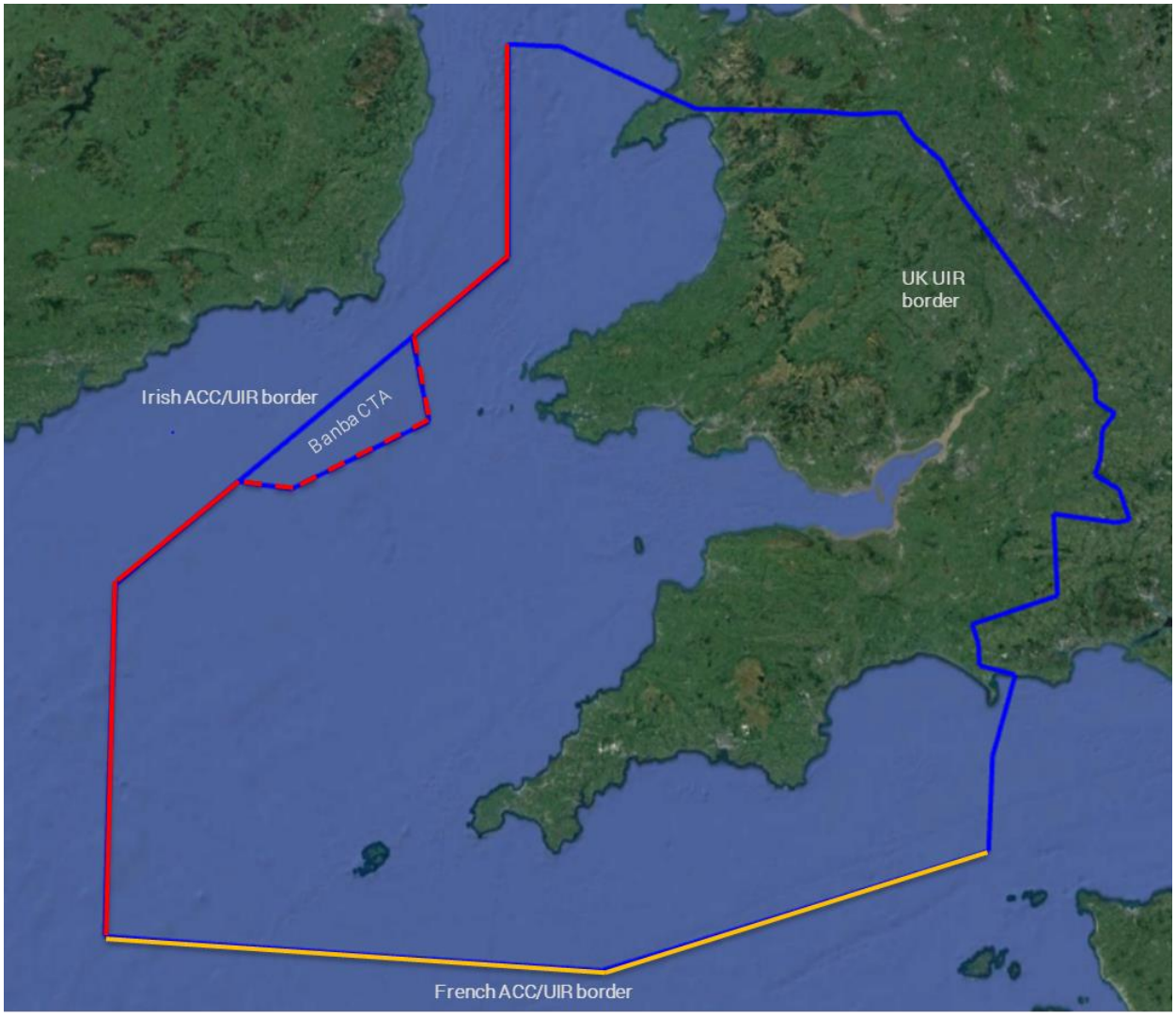


Figure 8 Free Route Deployment 2 Area showing boundaries with other FRA volumes

5.7 Special Use Airspace (Flight plan Buffer Zones)

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

5.7.2 The requirement for a buffer between ATS Routes and SUA is contingent on the 2014 CAA's SUA - Safety Buffer Policy for Airspace Design Purposes (Buffer Policy) (Ref 5).

5.7.3 To support the safe introduction of proposed FRA changes, NATS has reviewed the application of FBZs to ensure flight plans remain compliant and consistent with policy across the Deployment 2 Area.

5.7.4 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).

5.7.5 No specific separation criteria are specified for FRA trajectories[9]. Applying the criteria specified would have a significant impact to route/trajectory flight plan availability, as shown in the below diagrams. Figure 9 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 FRA D2 area.

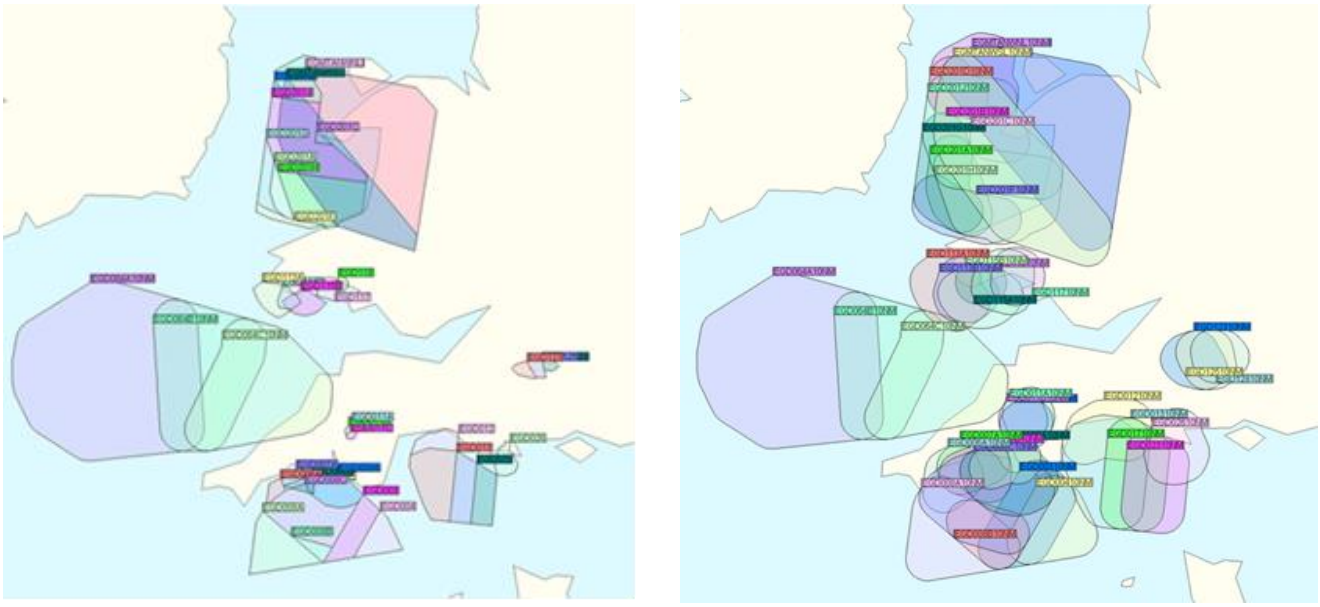


Figure 9 Airspace today (left) and Airspace with 10nm buffer applied to SUA (Right)

5.7.6 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 2). 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.

5.7.7 Stakeholders were directly asked as part of consultation for their views on the strategy to request dispensation from the policy. From the consultation responses, it is determined that stakeholders support this strategy, or they have no opinion (See Ref 18).

[9] In relation to FRA the policy states 'Route Free Operations Airspace requires, as necessary, means other than airspace design to ensure sufficient separation is applied between controlled flights and SUA. The arrangements for the employment of Flight Plan Buffer Zones are detailed in the European Route Network Improvement Plan Section 3.'

5.7.8 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 4)). As a result, dispensation is sought for the standard lateral 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.

5.7.9 For the purposes of applying a buffer to the NWMTA, it has been assumed that high energy manoeuvres are conducted within this SUA[10].

Methodology for FBZ development:

5.7.10 The FBZ is based on the CAA Buffer Policy (2014). In accordance with the precedent set in FRA D1 ACP (ACP-2018-11), it is assumed the additional 5nm required against upper ATS routes stipulated in the Buffer Policy is based on the ATS route NAV specification.

5.7.11 NATS has utilised the CAP1385 Performance-based Navigation (PBN): Enhanced Route Spacing Guidance as well as the High-Level-High-Speed (HLHS) trial report data, which provides route conformance data, and analytical data on DCT conformance[11]. This data shows a maximum deviation from the flight planned route / trajectory of 0.2nm, therefore in accordance with the precedent set in FRA D1, the additional 5nm required in the Buffer Policy was not used in the design of FBZs.

5.7.12 NATS has engaged extensively with the MoD to fully understand the following:

- The nature of the activity that occurs within SUA •
- The applicability of the AIP activity descriptors for each SUA •
- The safety barriers applied by the MoD to ensure containment for each SUA

5.7.13 In accordance with the Buffer Policy, the proposed buffer value for high energy manoeuvres is 5nm. The buffer value for all other activity types is 1nm, to cater for the route conformance deviation determined from CAP1385/ HLHS trial/ DCT conformance data.

5.7.14 The Buffer Policy stipulates a requirement for a 5nm buffer against BVLOS activity. Through joint safety analysis with the MoD[12], the evidence indicates that the risk of BVLOS activity exceeding the promulgated limits of SUA is extremely low (zero recorded instances) and it was determined that a 5nm buffer will not provide any meaningful mitigation. Through the SP406 process it was determined that a 1nm buffer (see para 5.7.12) was sufficient to be tolerably safe against BVLOS activity in SUA.

5.7.15 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 3 below.

5.7.16 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 and FRA trajectories unavailable for flight planning in IFPS. Furthermore, it is not proportional to provide a flight planning buffer against the Upper Airspace CTA as defined in AIP ENR 2.1.

[10] There are no hazardous activity descriptors in AIP ENR 5.2 for military exercise and training areas and air defence identification zones

[11] These are internal NATS reports and are supplied to the CAA and will not be published on the CAA portal.

[12] This was instigated to inform the update to the CAA Buffer Policy in 2019. It is NATS' understanding the Buffer Policy is still under review, so this work is ongoing.

5.7.17 The FBZ design for the SUAs contained in (or that interact with) the FRA Deployment 2 Airspace has been assessed in a HAZID workshop. The associated hazard mitigation is provided in the HAZID summary report, which is supplied to the CAA as Appendix 18[13].

5.7.18 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.

5.7.19 NATS has engaged with DSNA and the IAA to discuss options for cross-border FBZs. Both DSNA and the IAA have no requirement for FBZs associated to the proposed design within their FIR/UIR.

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 D009B EG D017 EG D013 EG D023	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 3 List of FBZs for Each SUA within the FRA D2 region

5.7.20 NATS is therefore requesting dispensation from the CAA SUA Buffer Policy (Ref 5) for this ACP to support the proposed designs of FRA D2 and LD1.1.

5.7.21 In consultation, stakeholders were asked for their views on how SUAs might be managed should the CAA not be minded to grant dispensation from the policy. A majority, where they have an opinion, have indicated support for the extended use of ASM booking protocols to maintain the en-route network capacity, should this be the case (see 3D document, Ref 18).

5.7.22 However, NATS wish to highlight that the extended use of ASM booking protocols would aim to maintain or improve airspace capacity but this would likely restrict access to SUA compared to the current situation. The MoD commented in their consultation response that, if the CAA do not grant dispensation from the CAA Buffer Policy (Ref 5), 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.

[13] This is commercially sensitive confidential material and will not be published on the CAA portal.

5.7.23 To apply a FBZ that is dependent on the activity being conducted within the SUA is necessary for the SUA to be managed by the Airspace Management Cell. To achieve this some administrative changes to EG 007A, EG D007B, EG D009B, EGD011A, EG D011B and EG D011C are proposed. See the draft AIP document (Appendix 1)

5.8 No Planning Zones (NPZs)

5.8.1 NATS are proposing 11 NPZs to be implemented to align flight planning options to required traffic flows through operationally sensitive and procedurally complex airspace. They have been designed to complement the systemised airspace developed in the LD1.1 ACP to ensure the ATC operation is able to manage the key north-south/east-west flows within the region. This ensures consistency between the aircraft operator (AO) flight planning data and ATC clearances / operational flight data.

5.8.2 NPZs are not defined in ICAO doc 10066 PANS-IAM, or in UK policies or regulations. NPZs are only defined in ERNIP Part 1 - The European Airspace Design Methodology Guidelines - General Principles and Technical Specification for Airspace Design. These guidelines do not provide airspace design policy or standards and recommended practices.

5.8.3 ERNIP (European Route Network Improvement Plan) Part 1 defines NPZs as follows:

- In order to avoid short crossing of multiple ATC airspaces and to manage ATC operationally sensitive areas, relevant zones unavailable for flight planning may be established.
- Within the airspace volume representing such zones the planning of flight trajectory is either not permitted or allowed under certain specified conditions. In order to assist the airspace users in the presentation of the intended flight operation, the flight planning limitation(s) shall be defined in the Route Availability Document (RAD).
- Airspace users can avoid such zones by flight planning via appropriate significant points around it or in accordance with allowed conditions.

5.8.4 Following stakeholder engagement, and with agreement of EUROCONTROL Network Manager[14] (NM), NATS now proposes that NPZs will be referenced in the AIP ENR 2.2 and defined in the Route Availability Document (RAD) section of the EUROCONTROL Network Operations Portal (NOP). This approach has been developed from engagement further to the approach outlined in the FRA D2 4A document.

5.8.5 The rationale for this as follows:

- FRA D2 proposes to use NPZs to align flight planning options to required traffic flows through operationally sensitive and procedurally complex airspace. This enables the ANSP to ensure correct RAD capture at the flight planning stage without undue complexity of RAD restriction. Using volumetric restrictions is more efficient than extensive and complex RAD restrictions.
- There are two existing NPZs published for FRA D1 in ENR 2.2. These were related to safety and ATC data flow rather than flight planning orientation through operationally sensitive and procedurally complex airspace and therefore the need to make operationally driven amendments is greatly diminished.

5.8.6 The use of NPZs for RAD traffic capture purposes is a new and innovative concept that has been developed through engagement with the EUROCONTROL Network Manager. Publishing NPZs in the RAD section of the NOP will enable NATS to make changes based on operational need in the most efficient manner.

5.8.7 NPZs may need to be updated post implementation to address unforeseen flight planning issues in the same way that we make adjustments to the RAD for all other airspace changes.

[14] NM are the authors of ERNIP Part 1

5.8.8 If they were to be defined in AIP ENR 2.2, any changes to NPZ definition would require an Airspace Change Proposal under CAP1616. This would:

- be subject to CAA Airspace Regulation resource, agreed ACP level, and the CAA priorities as directed by the Secretary of State for Transport. This would potentially result in an undesirable flight planning situation in the ATC operation for longer than is necessary
- result in a lack of agility in responding to operational matters that may unexpectedly require revision
- result in the CAA being accountable for making decisions on operational flight planning matters and associated safety implications, which is a function currently provided by the ANSP under the terms of the NERL Operating Licence.

5.8.9 Defining NPZs in the RAD section of the NOP enables us to easily deliver benefits when future concepts such as NPZ management and dynamic RAD are realised.

5.8.10 The requirement to publish NPZ is only defined within the ERNIP Part 1. These guidelines stipulate that NPZs would be published in AIP ENR 2.2. NATS, in agreement with EUROCONTROL NM, is proposing to publish the NPZs in AIP ENR 2.2 using a reference to the EUROCONTROL NOP for their definition.

5.8.11 A diagram of the proposed NPZs is not included within this ACP, as without the context of the RAD restrictions to be applied to them, they have zero impact on flight planning and therefore it is not proportional to publicise until the associated final RAD is updated and tested.

5.8.12 The proposed NPZs will be validated in line with standard EUROCONTROL NM RAD validation process. RAD validation testing does not align with, nor is it subject to, the ACP timescales. The LD1.1 and FRA D2 RAD validation will continue after ACP submission and CAA decision up until implementation.

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6. Impacts and Consultation

6.1.1 NATS has been actively involved in meetings and stakeholder engagement relating to the implementation of FRA for several years. Much of the initial engagement work undertaken prior to Deployment 2 (during Deployment 1) underpins the design proposed in this ACP and has contributed to the development of the FRA programme as a whole. For full details of these earlier activities, see the CAA's airspace change portal Free Route Airspace Deployment 1 (D1).

6.1.2 Given the similarity of the FRA proposals, the engagement and consultation work has had a degree of scalability to mitigate stakeholder consultation fatigue. A significant amount of engagement was undertaken in the development of Design Principles (DPs) for FRA D1, which for consistency of design throughout the UK high-level airspace, were used as the draft design principles for FRA D2. These are defined in the Stage 1 Design Principles document (Ref 11).

6.1.3 Design Options were also consistent with previous deployments. These were evaluated against the DPs and presented as Options 1 – 3 for consultation with targeted stakeholders. See Stage 2A Design Options (Ref 12) and Stage 2B Design Principle Evaluation (Ref 13) for full details.

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 Additional stakeholders were added in week 3 of the consultation. This included Borealis Alliance members who had been erroneously omitted during the compilation of the 'West' stakeholder list, and future airspace entrants i.e. drone/BVLOS operators who were identified and added to ensure inclusivity to potential future users of the airspace in this region. It should be noted that ANS (Finland) and Avinor (Norway) were omitted from the stakeholder list presented in Stage 3, however this was an error and they were included in the stakeholder list[15].

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

6.1.7 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. As described in Step 3D document, an additional email was sent to airlines as there had been a low uptake in responses and these are high interest high impact stakeholders.

6.1.8 There were no significant design changes following consultation.

6.2 Net impacts summary

Category	Impact	Evidence
Safety/Complexity	Nothing is foreseen which will impact on current safety performance.	See Para 3.4 and Section 9
Capacity/Delay	Capacity is not expected to change. As traffic levels grow, utilising alternative flight plan routes to avoid capacity constrained areas would reduce the likelihood of delay.	See Final Options Appraisal (Ref 20)
Fuel Efficiency/CO_2e	Total annual savings forecast: 2,171 tonnes fuel / 6,903 tonnes CO_2e (2023) 2,585 tonnes fuel / 8,221 tonnes CO_2e (2033)	See Para 6.4.1-6.4.8

[15] It is not deemed proportionate to update documents at a previous stage in the CAP1616 process hence this update is included here. were

Noise – Leq/ SEL	No impact, this is a Level 2B change[16]. Environmental analysis scaled equivalent to a Level 2 change.	See Para 6.5.1
Tranquillity, visual intrusion	No impact. Environmental analysis scaled equivalent to a Level 2 change.	See Para 6.5.1
Local Air Quality	No impact, this is a Level 2B change. Environmental analysis scaled equivalent to a Level 2 change.	See Para 6.5.1
Other Airspace Users	Negligible impact, no changes to volume or classification of CAS	See Para 6.3.14, 6.3.15-6.3.23 & 6.3.24-6.3.25

Table 4Net Impacts Summary

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 (Ref 15) document for a list of these stakeholders, a description of engagement activities and reasoning behind why these specific stakeholders were targeted[17].

Air Navigation Service Providers

6.3.3 Design Principle 12 (DP12) stated that connectivity to adjacent airspace (FRA or non-FRA) will be maintained or enhanced.

6.3.4 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 FRA D2 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 > east and westbound (Route Availability Document)
- COPs usage, new COPs
- Level capping
- FLAS (Flight Level Allocation Scheme)
- Sequencing of LTMA traffic
- D201 and the Dublin interface
- Climb / descent profiles for EIDW traffic
- EIDW new runway impact

[16] 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.

[17] The consultation targeted the stakeholders listed in Appendix A – 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.

6.3.5 The IAA responded in support of the proposed changes, with strong support for Option 1. Consultation feedback from the IAA is presented in the 4A Update Design document (Ref 19). Further to the published response to these comments, and the continued engagement described, NATS has now shared and published FRA significant points which resolves the concerns raised.

6.3.6 The IAA also expressed feedback on the development of the RAD. This does not form part of the published airspace design in the AIP, so is outside the scope of CAP1616, however the continuing engagement with the IAA has used the existing processes to ensure neighbouring ANSPs manage the RAD equitably.

6.3.7 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 FRA D2 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
- Level capping
- FLAS (Flight Level Allocation Scheme)
- Sequencing of Severn group traffic

6.3.8 Brest ACC responded in support of the proposed changes, with support for Option 1.

6.3.9 A response was received from NAVIAIR (Denmark); they support the proposed changes but have no option preference.

6.3.10 Borealis Alliance ANSPs have been engaged throughout and this design is in line with the Borealis FRA CONOPs.

Computer Flight planning Service Providers (CFSPs)

6.3.11 Design Principle 5 (DP5) stated that FRA should create an environment within which Aircraft Operators may freely flight plan optimised trajectories between defined entry and exit points.

6.3.12 FRA will enable increased flexibility in flight planning. Flight plans will more accurately reflect the trajectories flown. Two targeted CFSPs, Sabre and Lufthansa Systems, responded in support of the proposed changes.

Airports

6.3.13 Responses were received from nine airfield targeted stakeholders: Cornwall Newquay Airport, Farnborough Airport, London City Airport, Exeter & Devon Airport, Bournemouth Airport, Bristol Airport, Cardiff Airport, Southampton Airport, Heathrow Airport. All were in support of the proposed changes, other than Southampton Airport, who had no opinion, and stated that they didn't see any impact, and Cornwall Newquay Airport, who are ambivalent to the proposed changes.

National Air Traffic Management Advisory Committee (NATMAC) members

6.3.14 Two responses were received from targeted NATMAC stakeholders: British Helicopter Association (BHA) and British Gliding Association (BGA). The BHA has no opinion given the altitude of the proposed changes will not impact lower altitude helicopter operations. The BGA support the proposed changes, under the assurance (as stated in the consultation document)

that Upper Gliding Areas will be unaffected by the introduction of FRA. There are no changes proposed to the activation and management of the Upper Gliding Areas within the region.

Military impact and consultation

6.3.15 Design Principle 8 (DP8) stated that the FRA airspace will be compatible with the requirements of the MoD.

6.3.16 The proposed FRA is expected to have a minimal impact on MoD operations. Operational Air Traffic (OAT) flight plans will not be affected by NPZ & FBZ, which form part of the (International Flight Planning System) IFPS.

6.3.17 Where large scale military exercises occur, temporary flight plan restrictions would be managed by the CAA, Airspace Regulation (Utilisation) (notified by NOTAM).

6.3.18 Standing Coordination Procedures (SCP) apply between 78 Sqn and London Area Control (LAC) which allow Military Area Controllers to apply a minimum vertical separation of 1000ft (2000ft if relevant aircraft are either non-Reduced Vertical Separation Minimum (RVSM) approved in RVSM airspace or above FL410) without the need for coordination, up to and including FL450. SCP is predicated on GAT being established on the route structure.

6.3.19 Within FRA, it is proposed that this agreement is modified such that GAT is considered established on route when they are flying within 5nm of their flight planned trajectory, which is visible to Military Area Controllers. When GAT is not on its flight planned trajectory (or within 5nm), the initiation of coordination is a joint responsibility of both Military Area Controllers and LAC.

6.3.20 Additionally, an amendment is proposed to the current on-route status for GAT agreement west of 5°W between NERL and 78 Sqn, whereby GAT flying off-route tracks west of 5°W is considered to be continuously on route at or above FL290. NATS would like to lower the agreement to FL245 and above so it is consistent with the base level of FRA and re-define the lateral extent of the agreement. (See Draft LoA Appendix 11)

6.3.21 The MoD response to the consultation supported the proposed airspace change and stated that they agree with the proposal to amend the Standing Coordination Procedures with 78 Sqn. Other stakeholders have provided support or had no opinion.

6.3.22 Support is given from the MoD for the proposal to amend the on route status for GAT west of 5°W agreement. Other stakeholders have provided support or had no opinion.

6.3.23 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.

General Aviation airspace users' impact and consultation

6.3.24 Design Principle 9 (DP9) stated that the impacts on General Aviation (GA) and other civilian airspace users due to FRA will be minimised. There is not expected to be any impact on general aviation or sport aviation airspace users. Stakeholders were specifically asked in the consultation if they agreed with this impact assessment and indicated, where they have an opinion, that they agree.

6.3.25 The British Gliding Association (BGA) were consulted via NATMAC and responded in support, as described above. (See paragraph 6.3.14)

Commercial air transport impact and consultation

6.3.26 Design Principle 5 (DP5) stated that this change will create an environment within which AOs may freely flight plan optimised trajectories between defined entry and exit points. It is expected that this would have a positive impact on the operations of commercial airlines.

6.3.27 FRA will enable increased flexibility in flight planning, enabling flight plans to more closely reflect the trajectory flown. As such there may be benefits in reduced distances flown and reduced fuel uplift requirement. The introduction of FRA will enable AOs to flight plan the most

efficient trajectories through the airspace, however, actual trajectories planned may differ depending on AOs needs, therefore actual benefits may differ from those forecast within the ACP.

6.3.28 Consultation responses were received from nine airline targeted stakeholders: Delta Airlines, Flybe Ltd, Emirates Airline, Virgin Atlantic, TUI Airline, British Airways, KLM Royal Dutch Airlines, Ryanair and American Airlines. These were all in support of the proposed changes.

6.4 CO_2e environmental analysis impact and consultation

6.4.1 Design Principle 3 (DP3) stated that the proposed FRA airspace will facilitate the reduction of 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.

6.4.3 As indicated in Stage 4A Update Design (Ref 19), there are no proposed changes to the FRA D2 airspace design as a result of the consultation, due to the supportive and neutral responses received from stakeholders. As described in the 4A document, the design changes made in the interdependent LD1.1 (Ref 6) have led to improvements in the expected benefits for the holistic West Airspace (West) benefits from those presented at Stage 3.

6.4.4 As the FRA benefit is calculated as a proportion of the overall West benefit, this has improved the calculated FRA benefits from those previously provided. Despite there being no changes to the design as a result of the FRA D2 consultation, the Final Options Appraisal (Ref 20) therefore shows an increase in the expected benefits from those detailed in the Full Options Appraisal (Ref 17).

6.4.5 CO_2e emissions & fuel burn analysis has been performed using computer simulations which modelled the operation of the FRA D2 airspace. The results of this modelling indicate that the proposed FRA changes will result in an enabled reduction in average fuel burn and CO_2e emissions per flight.

6.4.6 The NATS Analytics team have completed a final environmental analysis on the proposed changes. Table 5 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).

6.4.7 Due to the interdependency with LD1.1 we have also assessed the benefits alongside those of the proposed LD1.1 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	-2,171	-1,637	**-3,808**	-6,903	-5,208	**-12,111**
2033	-2,585	-1,950	**-4,535**	-8,221	-6,201	**-14,422**

Table 5 Forecast enabled fuel burn and CO_2e emission savings

6.4.8 This analysis finds that in the first year of implementation, for FRA airspace there would be an enabled annual saving of 2,171 tonnes of fuel, and 6,903tonnes of CO_2e. This benefit is the result of shorter average routes due to direct great circle routes in the Deployment 2 Free Route Airspace. 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 FRA will only enable this benefit. Actual trajectories planned within FRA will be determined by airspace users[18].

[18] Fuel burn is converted to CO_2e emissions using the ratio 3.18.

6.5 Local environmental impacts and consultation

6.5.1 The changes proposed impact flights above 24,500ft. This is well 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 FRA change options.

6.5.2 This aligns with the Design Principle 4 (DP4) which stated that FRA will minimise environmental impacts to stakeholders on the ground.

6.6 Economic impacts

6.6.1 The development of this airspace change proposal has not been motivated by economic constraints or opportunities.

6.6.2 Design Principle 2 (DP2) stated that the proposed FRA airspace will facilitate optimised network economic performance. There is no forecast increase in air transport movements, passenger numbers or cargo carried as an outcome of this proposal. The flight-plan options this proposal would introduce could allow airlines to avoid capacity constrained areas and avoid consequential delay and cost. However, this is not quantifiable, and no specific capacity increase is assumed or claimed by this proposal.

6.6.3 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).

6.6.4 The monetised Net Present Value (NPV) benefit for FRA D2 calculated by WebTAG due to the reduction in per flight GHG emissions is £7,521,591.

6.6.5 We predict an enabled fuel burn cost benefit of £2,097,460 in 2023, predicted to increase to become an enabled saving of £2,497,436 in 2033. (NPV based on number of tonnes of aviation fuel saved using the IATA jet fuel price of September 2022, at 1,110.49 USD per tonne converted to GBP at 0.87£/$ and presumes a constant fuel price and exchange rate).

6.6.6 CAP1616 states that all environmental assessment requirements should be consistent with the information presented throughout the engagement and consultation (Appendix F, para 14), and that where applicable, the forecast information should be consistent across the two assessments (Para B31). CAP1616 also states that the CAA expects the change sponsor to use the most up-to-date and credible sources of data (paragraph E11).

6.6.7 It should be noted that the aviation industry is recovering from the COVID-19 pandemic, which may result in discrepancies between forecast and how air traffic will be impacted in the medium to long term. As a result, whilst the forecasts used are the best available, there is still a degree of uncertainty associated with them. Also, during the timeline of this ACP, have been significant national economic impacts linked to COVID-19, Brexit, and the war in the Ukraine, which include a significant increase in fuel costs. At the request of the CAA, NATS has produced updated benefit figures that consider the impact of this increase. A full description of the methodology is provided in the Final Options Appraisal V2 (Ref 20). This is provided in this submission in order to provide the most up to date and credible data, in accordance with CAP1616 para E11.

6.6.8 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 (Ref 8).

7. Analysis of Options

7.1 At Stage 1, we utilised the Design Principles previously developed for FRA Deployment 1. Representatives of stakeholder groups were engaged with, to develop and define the fifteen design principles underpinning this proposal (Ref 11).

7.2 At Stage 2, NATS considered design options for each of the FRA mandated requirements. There are 9 requirements for FRA originating from the PCP and Borealis (6.1), from which a longlist of 32 design components were developed (Ref 12).

7.3 NATS evaluated the longlist against the Design Principles. This allowed the mandated components to be assessed and considered in isolation, with design options for each assessed against the Design Principles. This was presented in a summary matrix of Design Options with a rating in relation to each Design Principle.

7.4 Feasible design components were developed and evaluated in more detail against the Design Principles. Combinations of these were then developed to construct full design options as described in Design Principle Evaluation (Ref 13).

7.5 The design options were considered as "do nothing" or "implement" – with 3 options developed for implementation throughout this process. Given the legal requirements to deliver FRA, "do nothing" was not considered a viable option.

7.6 The three alternative options which could be used to implement FRA in accordance with the mandated requirements are:

- FRA Option 1. In which all ATS routes are removed.
- FRA Option 2. In which the ATS route structure is partially maintained.
- FRA Option 3. In which the entire ATS route structure is maintained, but aircraft are not constrained to flight plan the ATS routes within the FRA.

7.7 For each of the Options 1-3 RAD restrictions would be introduced in order to manage the flow of traffic transitioning into and out of FRA and to enforce the ATC operational procedures at the flight planning stage.

7.8 NATS specified Option 1 as the preferred option. By removing the route structure, it encourages more efficient flight planning behaviour, thus increasing the likelihood of benefit realisation. It creates a consistent environment for air traffic controllers, whereby all confliction points are determined by aircraft trajectory.

7.9 While the mandate requires that FRA is implemented in airspace at and above FL310 as the minimum requirement, in the D2 area the FRA concept of operations will extend from FL245[19] and above, which is the established division between upper and lower airspace and the base of the London Upper CTA.

7.10 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. Within the FRA D2 airspace, it is NATS' preference to implement FRA from FL245 and above, which is in line with the preferred option of the LD1 ACP consultation.

7.11 NATS undertook a Full Options Appraisal (Ref 17) on the 3 options which quantified the analyses required by CAP1616. Due to the interdependency with LD1.1, we assessed the benefits for FRA D2 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.

[19] Flight data processing system limitations prevent considering FRA implementation at lower levels.

7.12 At Stage 4, it was made clear in the consultation document that for the FRA ACP, the design options and FRA design remain the same – the specific location of FRA entry/exit points and FRA vertical boundaries will be determined once the route structure below FRA is finalised (LD1.1).

7.13 The consultation resulted in support for the change, with no response elements which had a potential impact on the proposal design. A full summary of the consultation (Ref 17) and the feedback received (Ref 18) are described in the associated references.

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

7.15 Favourable environmental and economic benefits are anticipated from this change, as well as operational capacity benefits.

7.16 The final design is hereby submitted because it best meets the design principles, the mandated requirements 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.	Free Route Airspace - 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 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 details contained within Appendix 1-2 and Appendices 4-16
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 0
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 FRA environment 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 final Options Appraisal (Ref 20)
f	Analysis of the impact of the traffic mix on complexity and workload of operations	Current usage is shown in Section 3. Potential factors which could impact usage are described in Section 3.2.7. Operational capacity is predicted to increase. See Final Options Appraisal (Ref 20) and Section 3.5 & 9 (Human Factors)
g	Evidence of relevant draft Letters of Agreement, including any arising out of consultation and/or airspace management requirements	See Draft LoAs (Appendices 4-16)
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)	FRA is a major initiative of the CAA's Airspace Modernisation Strategy (AMS CAP1711). Implementing FRA complies with EU Implementing Regulation EU716/2014 and ICAO Annexes. See Appendices 1 & 2. This proposal delivers the aims of the AMS whilst also meeting CAA, ICAO and EUROCONTROL Network Management requirements
i	The proposed airspace classification with justification for that classification	No change to existing airspace classification
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	N/A - this proposal does not change any existing/ introduce new airspace user access

9. Safety and Human Performance 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 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 Modernisation 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 (ValSims) Simulations 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 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 Appendix 1 for changes associated to IFR general air traffic
b	Impact on VFR operations (including VFR routes where applicable)	No change - FRA D2 is wholly contained within Class C Airspace. See UK AIP (Ref 9) ENR 1.1 Para 4 for VFR requirements
c	Consequential effects on procedures and capacity, i.e. on SIDs, STARs, and/or holding patterns. Details of existing or planned routes and holds	None. See LD1.1 ACP (Ref 6) for hold details
d	Impact on aerodromes and other specific activities within or adjacent to the proposed airspace	FRA is established at FL245 and above. Arrival and Departure Connecting Points are incorporated to retain existing connectivity with the Lower Route structures, such connectivity does not impact upon aerodrome operations. See Appendix 2
e	Any flight planning restrictions and/or route requirements	Flight planning restrictions from FL245 and above will be managed in the RAD are therefore out of scope of the CAP1616 process

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	N/A – no Navigation specification associated with FRA volumes
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. See Appendix 19. Demonstrably adequate for the region. Contingency arrangements detailed in LOAs See Appendices 4-16
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 and management protocol will continue to apply as today. See Appendices 4-16
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 c.120-150 NATS controllers, and c.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	No change - FRA D2 is wholly contained within Class C Airspace
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.	No additional structures are required for radar control purposes. NATS is seeking dispensation from the Safety Buffer Policy. See Section 0 and Appendices 17&18
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	Existing systems will be utilised
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	FRA is a new airspace structure, wholly contained in Class C airspace. Existing ATC procedures will apply
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
f	There must be assurance, as far as practicable, against unauthorised incursions. This is usually done through the classification and promulgation	As today– no proposed changes to airspace classification or volume
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 (Ref 7)
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. Radio Frequency Coverage Assessment has been undertaken and minor adjustments to Designated Operational Cover will be undertaken. See Appendix 19. Demonstrably adequate for the region

	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	FRA is wholly contained with Class C airspace, as notified. Adjacent state agreements are provided in Appendices 5 & 16
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	FRA is wholly contained with Class C airspace, FL245 and above. Pilots require clearance to enter and must comply with ATC instructions

	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	FRA removes routes, lower routes are vertically extended to connect to FRA. See Appendix 1
b	Where ATS routes adjoin terminal airspace there shall be suitable link routes as necessary for the ATM task	FRA removes routes, lower routes are vertically extended to connect to FRA. See Appendix 1
c	All new routes should be designed to accommodate P-RNAV navigational requirements	FRA removes routes, lower routes are vertically extended to connect to FRA. See Appendix 1

	Terminal airspace requirements	Evidence of compliance/ proposed mitigation
	Changes to link with proposed terminal structures are described in Appendix 1 and 2	

	Off-route airspace requirements	Evidence of compliance/ proposed mitigation
	FRA is wholly contained in Class C Airspace (Upper Airspace CTA See Ref 9)	

14. 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 (Ref 8)
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 Final Options Appraisal (Ref 20) and Para 6.4.1-6.4.8
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
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 Para 6.4.1-6.5.2

Reversion Statement

12.1 Due to the removal of ATS Routes the changes proposed in this ACP would permanently and significantly change the airspace structure, hence making reversion complex and extremely difficult.

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

12.3 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.	Appendix Title	Remarks
1	Draft AIP Changes	Published on portal
2	Arrival and Departure Connecting Points	Published on portal
3	CAA Aeronautical Data Template	(NO PUBLISH)
4	Draft LOA Aberporth STU RCA-PTA	(NO PUBLISH)
5	Draft LoA Brest	(NO PUBLISH)
6	Draft LoA Castlemartin & Manorbier	(NO PUBLISH)
7	Draft LOA MOD Pendine	(NO PUBLISH)
8	Draft LOA NATS BMFHQ ARU Status	(NO PUBLISH)
9	Draft LOA NATS 78 Sqn (MIL) BGA Warton TRA(G)	(NO PUBLISH)
10	Draft LOA NATS BAE Warton RAF (U) Swanwick (AR)	(NO PUBLISH)
11	Draft LOA NATS HQ AIR HQ Navy BAE Warton	(NO PUBLISH)
12	Draft LOA RAF Valley MOD Aberporth	(NO PUBLISH)
13	Draft LOA RAF (U) HQAir SWMDA	(NO PUBLISH)
14	Draft LOA RNAS Yeovilton	(NO PUBLISH)
15	Draft LOA Salisbury Plain	(NO PUBLISH)
16	Draft LOA Shannon	(NO PUBLISH)
17	Validation Simulation Executive Summary	Supplied separately (NO PUBLISH)
18	HAZID report	Supplied separately (NO PUBLISH)
19	Surveillance Coverage Assessment	(NO PUBLISH)
20	Engagement evidence	Published on portal
21	Draft LOA FOST	(NO PUBLISH)
22	Draft LOA Cotswold	(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)
AMC	Airspace Management Cell
AMS	Airspace Modernisation Strategy
ANSP	Airspace Navigation Service Provider
ARP	Airspace Restructuring Programme
ASR	Airspace Safety Review
ATC	Air Traffic Control
ATS	Air Traffic Services
B2B	Business to Business
BGA	British Gliding 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.
BVLOS	Beyond Visual Line of Sight
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
CFSP	Computer Flight Plan Service Providers
COP	Co-ordination Point
CTA	Control Area
CTR	Controlled Traffic Region
D2	Deployment Two, the second deployment of FRA.
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
EU	European Union
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.
FLAS	Flight Level Allocation Scheme
FRA	Free Route Airspace
GA	General Aviation
GAT	General Air Traffic
GHG	Greenhouse Gases
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
IFR	Instrument Flight Rules
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
LoA	Letter of Agreement
MoD	Ministry of Defence
NAT	North Atlantic Tracks
NATMAC	National Air Traffic Management Advisory Committee
NDB	Non-Directional Radio Beacon
NM	Network Manager
NPV	Net Present Value

NPZ	No Planning Zone
OAT	Operational Air Traffic
PBN	Performance Based Navigation – international requirements which standardise accuracy, safety and integrity for satellite navigation systems.
PCP	Pilot Common Project
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.
RVSM	Reduced Vertical Separation Minimum
SARG	Safety and Airspace Regulation Group
SARP	ICAO Standards and Recommended Practices
SCP	6.3.17 Standing Coordination Procedures
SID	Standard Instrument Departure
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
UAS	Unmanned Airborne Systems
UIR	Upper Information Region
VFR	Visual Flight Rules
VOR	Very High Frequency Omni-Directional Radio Range