Free Route Airspace Deployment 2.1

CAP1616 documentation:
Stage 4 Update & Submit

Step 4A Update
&
Step 4B Submit
Airspace Change Proposal

V1.0

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Unclassified

Roles

Action	Role	Date
Produced	**Airspace Change Specialist** NATS Airspace and Future Operations	March 2021
Reviewed Approved	**ATC Lead** NATS Swanwick Development	March 2021
Reviewed Approved	**FRA Project Manager L6260** Operations & Airspace Programme Delivery	March 2021
Reviewed Approved	**Head of Airspace Development** Airspace and Future Operations	March 2021

Publication History

Issue	Month/Year	Changes this issue
1.0	March 2021	Submitted to CAA

Step 4A Update Design

1.1. The intent of this section of the document is to summarise and satisfy the requirements of CAP1616 Stage 4A Update Design. There are no proposed changes to the design post Stage 3 Consultation. The feedback that we received from stakeholders in response to the consultation are all in support of the preferred option or ambivalent, as described in the Stage 3D Consultation Response document (Ref 10).Therefore, we are proposing to implement the preferred option, Option 1, which is to remove all ATS routes and rationalise waypoints in accordance with the DSNA Brest ACC FRA design in both the PEMAK Triangle and TAKAS Box.

Step 4B Submit: Contents

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1. Introduction

1.1. The intent of this section of the document is to summarise and satisfy the requirements of CAP1616 Stage 4B: Submit Airspace Change Proposal (ACP) to the CAA (Civil Aviation Authority). The CAA reference is ACP-2020-039. The link to the CAA progress page is here.(Ref 1)

1.2. Free Route Airspace (FRA) is a major initiative of the UK CAA's Airspace Modernisation Strategy (AMS) (CAP1711: Ref 2). The implementation of FRA by European Union (EU) member states was mandated in European Law under the EU Implementing Regulation EU716/2014 (Ref 3) and has been recommended as part of the Single European Sky ATM Research (SESAR) programme.

1.3. Free Route Airspace will allow aircraft in upper airspace to flight plan and fly between existing points and not be constrained to follow the current network of ATS routes. The concept will also 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.

1.4. Aligned to the UK AMS, NATS is proposing to phase the introduction of Free Route Airspace (FRA) across UK airspace. This deployment is specifically concerned with the introduction of FRA in airspace where the provision of ATS has been delegated to the IAA Shannon ACC and the DSNA Brest ACC in the south west corner of the UK UIR. These regions are currently known as the PEMAK Triangle and the TAKAS Box and are depicted in Figure 1 below. NATS sponsors this airspace change but the provision of Air Traffic Services (ATS) in the region has been delegated to Brest and Shannon for decades. This provides the best primary radar cover and enables the most efficient management of traffic flows. The introduction of FRA will allow aircraft in upper airspace to flight plan and fly between waypoints and not be constrained by the current network of routes.

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

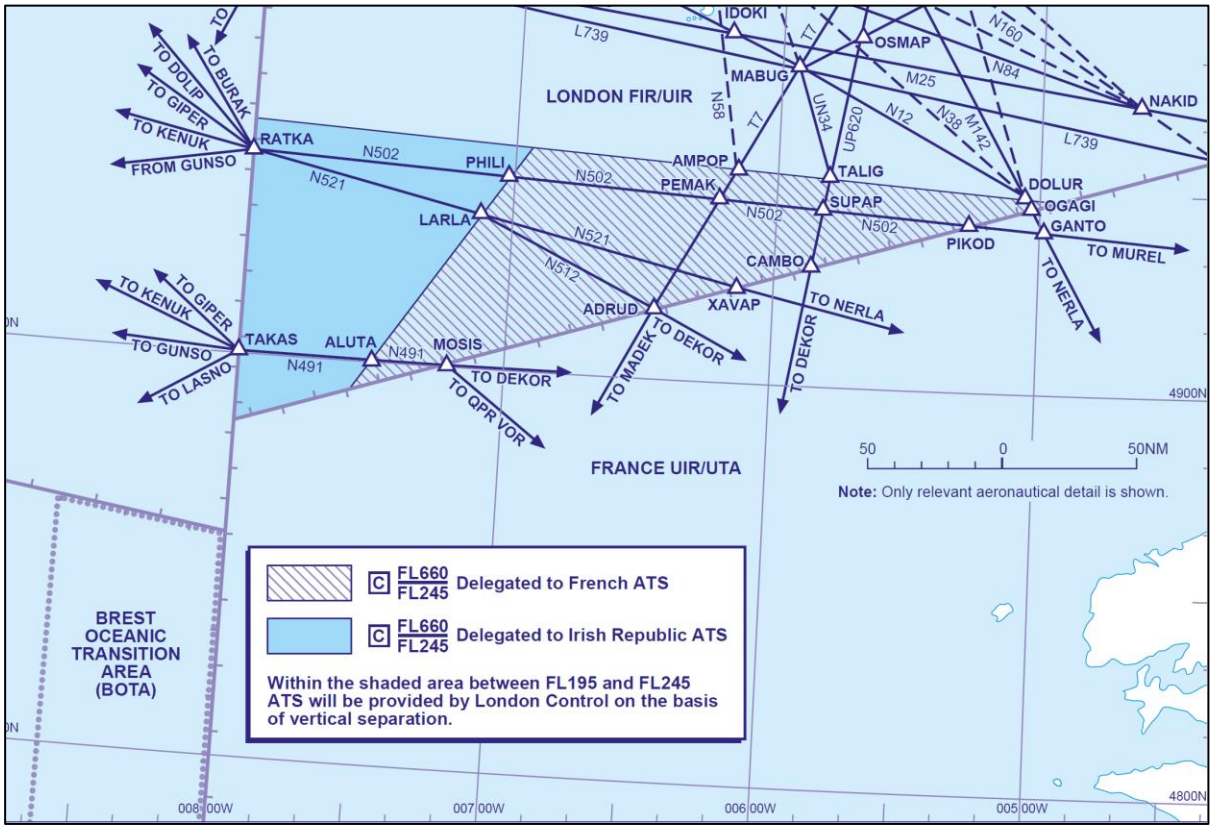

Figure 1: Free Route Airspace, Deployment 2.1 Area (extant ATS route structure)

2. Executive Summary

2.1. Free Route Airspace 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 way points, without reference to the ATS route network, subject to airspace availability"[1]. Within this airspace, flights remain subject to air traffic control.

2.2. The concept of FRA where aircraft can fly between points and are not constrained to follow a network of routes, is well established.

2.3. This ACP proposes the introduction of FRA in the south west corner of the UK UIR (Upper Information Region), and area of airspace delegated to the IAA Shannon ACC and DSNA Brest ACC. Within this airspace, aircraft currently flight plan along the published route structure, or on published Directs.

2.4. This Airspace Change is being implemented in order to:

- meet EU legal requirements,
- comply with the CAA AMS,
- fulfil Borealis Alliance commitments with neighbouring States,
- enable environmental efficiencies in the form of CO_2e reduction,
- and economic efficiencies in terms of fuel burn reduction.

2.5. Details of stakeholder engagement and consultation is extensive and documented. The design options have been developed throughout the CAP1616 process, and this is evidenced throughout the document. Following consultation, the final design option was selected which is to implement FRA within both the PEMAK Triangle and the TAKAS Box with all ATS routes removed in both areas.

2.6. The UK FRA deployment plan initially sought to introduce FRA in this region as part of the second FRA deployment, known as FRA D2, which originally aligned with Brest ACCs' airspace change requirements and schedule. The UK's FRA timeline has changed but the Brest timeline cannot. For this reason, the PEMAK Triangle and TAKAS Box is now progressing separately, as FRA Deployment 2.1, in accordance with Brest ACC's timelines and requirements

2.7. While the legal mandate requires that FRA is implemented in all airspace at and above FL310, in the FRA D2.1 areas, FRA will be proposed in line with the levels in which the provision of ATS has been delegated i.e. at FL245+. This document describes the proposed changes and provides examples. The impacts of the proposed changes are assessed and discussed.

2.8. Safety and human factor assessments determine there are no risks to safety from this proposal. There are no expected changes in capacity. The proposal is expected to enable annual savings of between 1,606 tonnes of CO_2e (2022) and 2,209 tonnes by 2032[2]. Due to these changes being in Upper Airspace and wholly over the high seas, there are no noise or other environmental impacts assessed.

[1] http://www.eurocontrol.int/articles/free-route-airspace

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

3. Current Airspace Description

3.1. This section describes the current airspace which forms the baseline.

Structures and Routes

3.2. Figure 2 shows the current PEMAK Triangle (cross-hatched area), and TAKAS Box (shaded blue) delegated ATS Upper information Region (UIR) airspace and Air Traffic Service (ATS) route network.

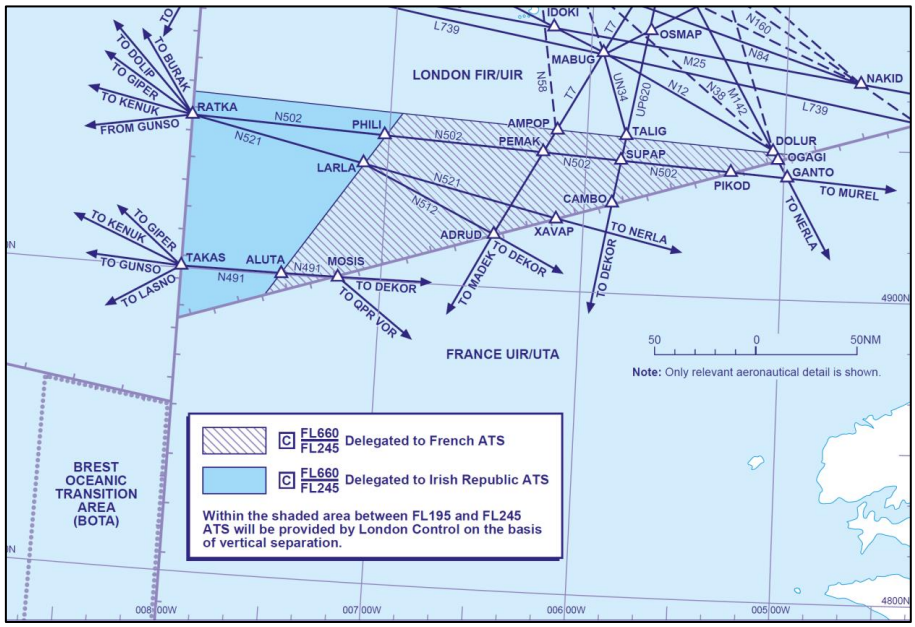

Figure 2 Current PEMAK Triangle and TAKAS Box UIR airspace/ ATS routes

3.3. For reference, the extant UK route structure is defined in detail in the following sections of the UK Aeronautical Information Publication (AIP) (Ref 4):

ENR 3.3 AREA NAVIGATION ROUTES

ENR 6.70 UPPER AIRSPACE CONTROL AREA AND UPPER ATS ROUTES (South Sheet)

Airspace usage and proposed effect

3.4. Currently all aircraft flight plan to fly along the published Air Traffic Service (ATS) route structure. Modern satellite navigation now makes navigation between any points possible. It is now commonplace for air traffic control (ATC) to allow aircraft to route direct to a point (termed a tactical direct), to improve efficiency as aircraft transit through the airspace.

3.5. **Error! Reference source not found.** shows current flight-path density plots (from 2018 radar data).

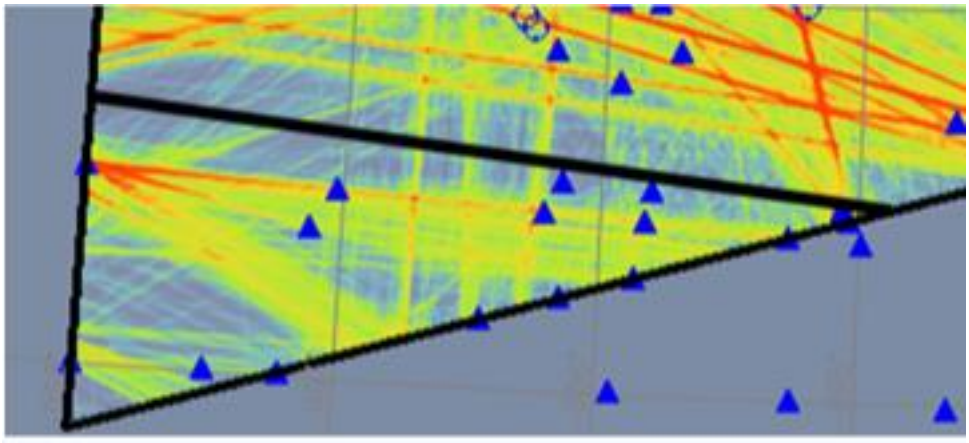

Figure 3 Current PEMAK Triangle and TAKAS Box UIR traffic flows

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3.6. This shows the typical flows of traffic in the UIR. The use of the designated entry/exit points (termed coordination points (COPs)) at the UIR boundary, and the influence on flightpaths of 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.

3.7. 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.

3.8. 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)
- military activity
- ATC traffic regulations (used to manage flows)
- industrial action
- events such as large sporting events (e.g. football matches, Olympics etc)

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

3.9. In addition, 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.

Operational efficiency, complexity, delays and choke points

3.10. 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.

Safety issues

3.11. There are no specific safety issues associated with any of the routes and structures (where NATS provides the ATS) related to this airspace change proposal.

3.12. 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.

3.13. The IAA and DSNA follow their own State regulatory safety processes, which are ultimately regulated by EASA (European Union Aviation Safety Agency).

Human Performance issues

3.14. NATS' Human Performance Specialist for the FRA Programme 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. No human performance issues have been identified as a result of this proposed airspace change.

Environmental issues

3.15. 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.

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4. Statement of Need

4.1. The Statement of Need v2 (DAP1916-V2-68) submitted in December 2018 is as follows:

This ACP is part of the programme to introduce Free Route Airspace (FRA) in a phased manner across all UK upper airspace. This programme was initiated in response to SESAR PCP Implementing Regulation EU716/2014. 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.

FRA aims to improve flight efficiency by enabling aircraft to flight plan and fly user-preferred routes, where possible. FRA is being implemented internationally and is already in operation in several neighbouring states. It is also in accordance with the CAA's Airspace Modernisation Strategy (AMS) (Sections 4.5-4.11 refer specifically to FRA as a means to improving efficiency in the upper airspace). The introduction of FRA will enable environmental benefit by enabling airline operators to reduce CO2e emissions per flight, which in turn would produce economic benefit due to reduced operating costs.

This ACP proposes the introduction of FRA in the PEMAK Triangle and TAKAS Box areas of airspace (defined in AIP ENR 2.2 1.7). Air Traffic Services are delegated to France and Ireland respectively in these areas.

The introduction of FRA in UK airspace will ensure that the UK upper airspace is harmonised with that of neighbouring states, enabling cross-border free routing. Specifically, the objective of this ACP is to allow the harmonised introduction of FRA in the PEMAK Triangle and TAKAS Box, in coordination with FRA implementation in the adjoining French airspace.

5. Impact of COVID 19 (CV-19) and FRA

5.1. The CAP1616 process requires that forecasts and analyses are provided for implementation + 10 years (CAP1616) It should be noted that following the COVID-19 pandemic there has been a significant increase in uncertainty in how air traffic will be impacted in the long term. As a result, whilst the forecasts used are the best available, they still have significant uncertainty associated with them.

6. Secretary of State Call In

6.1. 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. (Ref CAP1616 Pg70 Para 250 et seq) If the proposed change:

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

6.2. The Secretary of State has provided statutory guidance on the meaning of these criteria. For FRA D2.1 NATS assess that none of these Call-In criteria apply.

7. Proposed Airspace Description

Objectives/ requirements for Proposed Design

7.1. The purpose of this ACP is to allow the harmonised introduction of FRA in the PEMAK Triangle and TAKAS Box, in accordance with DSNA FRA implementation within the Brest AoR.

7.2. In coordination with DSNA Brest ACC and IAA Shannon ACC four key objectives and associated constraints were identified:

Objective 1: Fulfil SESAR PCP[3] Implementing Regulation EU716/2014

7.3. Deployment of FRA is a legislative requirement of the SESAR Pilot Common Project (PCP) ATM Functionality 3 (AF3) Implementing Rule. This requires ANSPs to implement FRA, at FL305+, by 1st January 2022.

7.4. NATS is undertaking this ACP on behalf of DSNA and the IAA to ensure the UK meets its legal obligations,

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

7.5. The CAA's AMS CAP1711 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.

7.6. NATS has committed to participate in the Borealis Alliance FRA Programme. Borealis Alliance members[4] 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.

7.7. This ACP aims to introduce Free Route Airspace (FRA) within airspace where the provision of ATS has been delegated to Brest and Shannon ACCs in the south west of the UK UIR. Free route airspace is being implemented across the ICAO EUR region and is already in operation in several neighbouring States. The introduction of FRA in this region will ensure that the UK upper airspace is harmonised with that of our neighbouring states, enabling cross-border free routing in the future.

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

7.8. The introduction of FRA would enable environmental benefit by allowing airline operators to flight plan more efficient trajectories which could reduce CO2e emissions per flight. This in turn would produce economic benefit due to reduced operating costs.

7.9. Additionally, the deployment of FRA where ATS is delegated to France and Ireland has the following constraints which are considered in this ACP:

- Brest ACC must deploy FRA to meet the extant PCP mandate: *Flexible Airspace Management and Free Route shall be provided and operated in the airspace for which the Member States are responsible at and above FL310 in the ICAO EUR region from 1 January 2022.*
- Brest ACC's Flight Data Processing System (FDPS) cannot operate in a mixed mode, i.e. where one volume of airspace is FRA and another part consists of a 'conventional' ATS route structure. Therefore, they have to remove the route structure in published FRA.

[3] The Single European Sky ATM Research (SESAR) Pilot Common Project (PCP) has been formalised in EU law under the Implementing Regulation EU716/2014. For more detail see the SESAR website.

[4] Avinor, EANS, ANS Finland, IAA, ISAVIA, LGS, LFV, NATS, Naviair

- NATS sponsors this airspace change but does **not** provide an air traffic service to aircraft in the region. ATS in the region has been delegated to Brest and Shannon ACCs for decades. The flows in the region essentially join Brest's Area of Responsibility (AOR) with the AOR of Shannon, crossing a small corner of southwestern UK airspace FL245+ without any interaction by UK (NATS) controllers.
- The French and Irish primary radar cover in this region at 25,000ft is **better** than that available to NATS controllers (see UK AIP ENR 6-10).
- Brest ACC has a **fully mature airspace design** for the entire Brest ACC AOR, including this region, suitable for their FDPS.
- Brest ACC has followed **French airspace change process** regulatory requirements to develop their design – NATS has no influence on that process.
- The IAA already operate FRA (fulfilling the PCP mandate). The IAA have stated that they are content to change the airspace within the TAKAS Box in accordance with Brest ACC's airspace requirements and timeline.

Proposed New Airspace/ Route Definition and Usage

7.10. While the legal mandate requires that FRA is implemented in all airspace above FL310, in the FRA D2.1 area the FRA concept of operations will extend down to FL245+, in line with the levels in which the provision of ATS has been delegated.

7.11. The proposed solution is in accordance with the DSNA Brest ACC FRA design, as shown in Figure 4, and proposes to remove all ATS routes and rationalise waypoints in both the PEMAK Triangle and TAKAS Box as illustrated in Figure 5 Free Route Airspace, Deployment 2.1Figure 5.

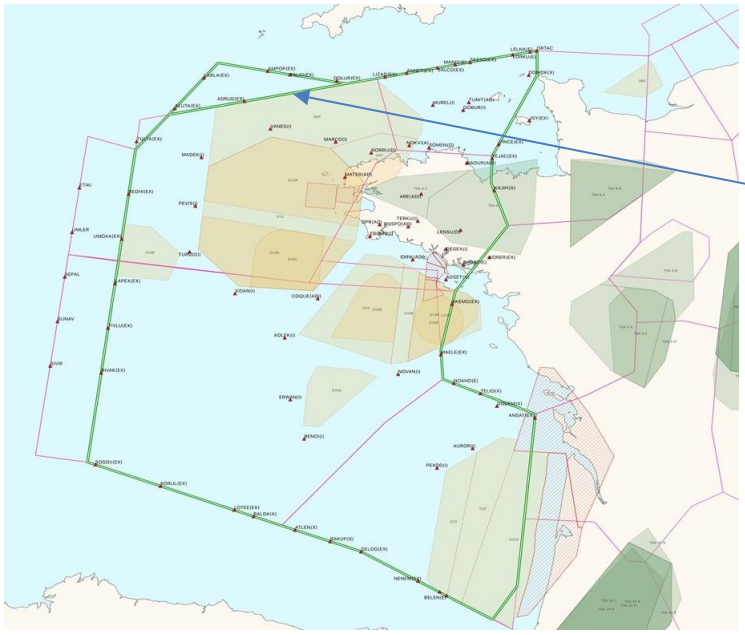

Figure 4 DSNA Brest ACC FRA Design

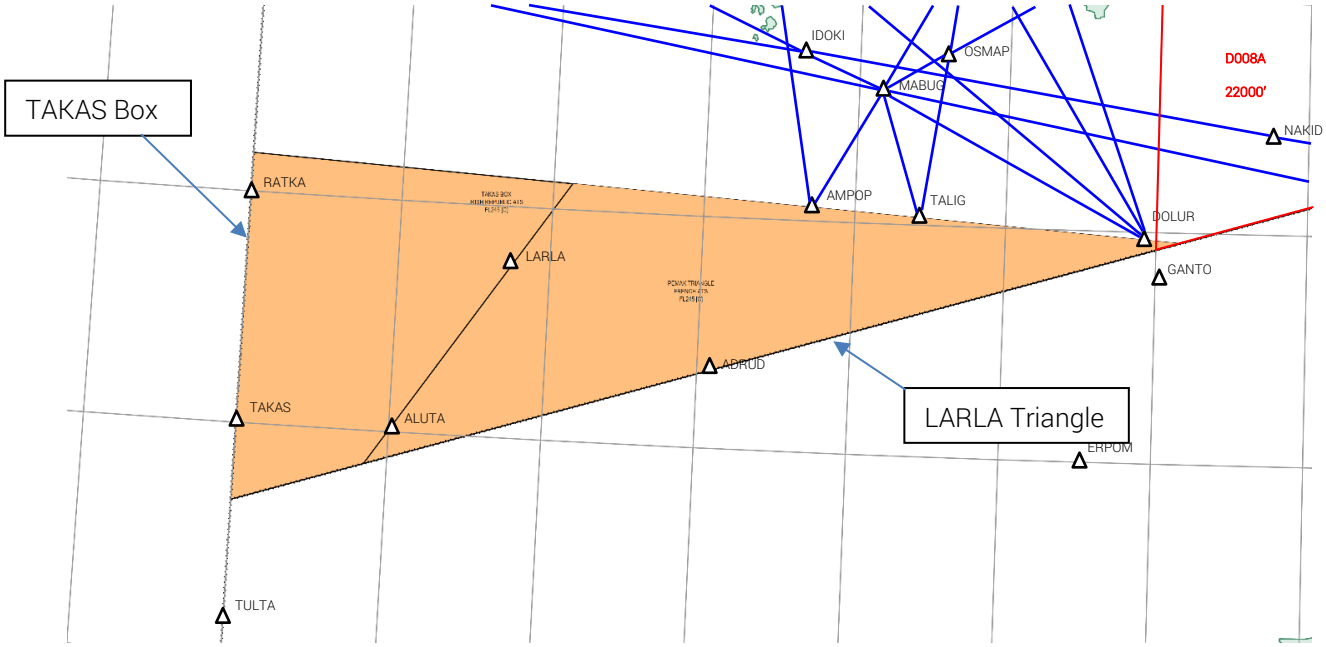

Figure 5 Free Route Airspace, Deployment 2.1

7.12. Retained waypoints are shown in Figure 6. The proposed removal of PEMAK would necessitate renaming of the area in which ATS is delegated to DSNA Brest ACC. It is proposed that it is renamed the LARLA Triangle.

Existing waypoints within the region	Retained waypoints within the region
DOLUR	DOLUR
TALIG	TALIG
AMPOP	AMPOP
RATKA	RATKA
PHILI	
PEMAK	
SUPAP	
PIKOD	
OGAGI	
CAMBO	
XAVAP	
ADRUD	ADRUD
LARLA	LARLA
MOSIS	
ALUTA	ALUTA
TAKAS	TAKAS

Figure 6 Waypoint Rationalisation

7.13. Free route trajectories/traffic flows would be managed in the French RAD and Irish RAD. The removal of ATS routes in the TAKAS Box provides a consistent FRA design throughout the airspace in which the IAA Shannon ACC provide the ATS. Furthermore, this option is consistent with the Borealis FRA concept and the removal of ATS routes is consistent with EUROCONTROL guidance.

Overflights.

7.14. Aircraft transiting FRA will have to flight plan via FRA Entry and FRA Exit waypoint to transit between FRA and an ATS route structure. Aircraft will be able to flight plan FRA intermediate waypoints within the FRA volume.

Arrivals

7.15. There is no requirement to publish any of the waypoints within the PEMAK Triangle or TAKAS Box as FRA arrival points.

Departures

7.16. There is no requirement to publish any of the waypoints within the PEMAK Triangle or TAKAS Box as FRA departure points.

Borealis Alliance/Cross Border FRA

7.17. The Borealis Alliance membership (which includes NATS and the IAA) have worked cooperatively since 2012 to develop a common FRA concept of operations.

7.18. 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 (Cross-Border) 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; without the need for crossing boundaries at mandated points (COPs). The DSNA Brest ACC FDPS is unable to process cross border FRA flight plans and DSNA are not part of the Borealis Alliance. Therefore, cross-border FRA will not be considered within this proposal.

PBN equipage

7.19. The FRA airspace will not be designated as having an associated RNAV specification (as is required for ATS routes). However, RNAV5 equipage is mandated above FL100 and hence all aircraft (other than State aircraft) operating in this airspace must be RNAV5 equipped as a minimum.

Traffic management and separation

7.20. The proposed FRA will be managed by DSNA Brest ACC and the IAA Shannon ACC, who will provide the ATS. Optimisation of traffic flows will be achieved in areas of high traffic density and complexity through the use of RAD restrictions.

Special Use Airspace

7.21. There are no SUA volumes within the region, however, the 2,000ft buffer[5] required between the upper limit of EG D008A (22,000ft) and the lowest flight plannable free route trajectory (FL250), may not exist depending on the QNH in use within the SUA. The buffer requirements against this SUA will be applied procedurally, in accordance with paragraph 3.1 b of the SARG Special Use Airspace - Safety Buffer Policy for Airspace Design Purposes.

7.22. A Minimum Flight Level (MFL) procedure[6] will be introduced at DOLUR. This only affects small numbers of aircraft when the atmospheric pressure is very low.

[5] In accordance with the SARG Special Use Airspace - Safety Buffer Policy for Airspace Design Purposes

[6] This is an extension of a current procedure already defined in the MATS Part 2.

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8. Impacts and Consultation

8.1. The key stakeholders most impacted by this Airspace Change Proposal are DSNA Brest ACC and IAA Shannon ACC, as the ATS providers for the affected areas. Other key stakeholders are also identified as being impacted.

8.2. NATS commenced a focused consultation on the proposed airspace changes on 11th January 2021. The consultation was conducted via the CAA online portal where users could submit a formal response alongside viewing the consultation document (Ref 10). The consultation document provides information on how the consultation was administered; an overview into the current airspace; the proposed changes and impacts of the proposed changes.

8.3. The consultation was open for four weeks; closing on 8th February 2021. A total of fourteen responses were received during this period, which are covered in the following sections. A full summary of how the consultation was run and a theming of all responses can be found in the Stage 3 Step 3D Collate and Review Responses Report (Ref 12)

Category	Impact	Evidence
Safety/Complexity	No safety issues or hazards were identified during the HAZARD analysis work. Overall, the impact of FRA will not fundamentally change the management of traffic in the affected sectors, and where there are differences, these will be managed through training and best practice.	See Para 3.1 and Section 9
Capacity/Delay	Capacity is not expected to change. As traffic levels grow, utilising alternative flight plan routes to avoid restrictions would reduce the likelihood of delay	See Section 3.4 - 3.10
Fuel Efficiency/CO_2e	Total annual savings: Forecast (based on 2020 traffic forecast) -505 tonnes fuel / -1,606 tonnes CO_2e (2022) -695 tonnes fuel / -2,209 tonnes CO_2e (2032)	See Section 8.16 – 8.22
Noise – Leq/ SEL	No impact, this is a Level 2B change[7]. Environmental analysis scaled in accordance with a Level 2 change.	See Section 8.23
Tranquillity, visual intrusion	No impact (changes are all over the high seas). Environmental analysis scaled in accordance with a Level 2 change.	See Section 8.23
Local Air Quality	No impact, this is a Level 2B change. Environmental analysis scaled in accordance with a Level 2 change.	See Section 8.23
Other Airspace Users	No impact, no changes to volume or classification of CAS	See Section 8.4 -8.13

Units affected by the proposal

8.4. It is imperative that our key stakeholders are effectively engaged within the design process, to ensure feasibility and effectiveness of the proposed change in line with operating procedures. As the sponsor of this ACP on behalf of DSNA and IAA, NATS has engaged significantly with these key stakeholders on the planned changes, with individual briefings, multi-agency meetings and design workshops, and tripartite workshops and meetings to help refine the options and coordinate the timescales.

8.5. A targeted group of aviation stakeholders were also specifically engaged for this consultation. These included Computer Flight Service Planning providers (CFSPs); National Air Traffic Management

[7] 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.

Advisory Committee (NATMAC) members; Airlines; and the Ministry of Defence (MoD). These are all listed in Annex A – List of Stakeholders. A description of engagement activities and reasoning behind why these specific stakeholders were targeted[8] can be found in the Consultation Strategy Document (Ref 9).

Air Navigation Service Providers

8.6. Design Principle 2 (DP2) states that the proposed FRA airspace will be consistent with the airspace design requirements of DSNA Brest ACC. Brest ACC have responded to the consultation confirming this proposal would have a positive effect on their ATC provision in this region and supported the proposal.

8.7. Design Principle 3 (DP3) states that the proposed FRA airspace will be consistent with the airspace design requirements of IAA Shannon ACC. The IAA have responded to the consultation in support of the proposed design and stating that this best meets operational ATS for this area and progresses the management of the Shannon UIR (SOTA), DSNA and NATS airspace. This also supports Design Principle 7, which states that connectivity to adjacent airspace (FRA or non-FRA) will be maintained or enhanced.

8.8. Responses from EUROCONTROL and DGAC also show support for the proposed changes and outline the benefits to ATC providers of the FRA provision in this region.

Computer Flight planning Service Providers (CFSPs)

8.9. FRA will enable increased flexibility in flight planning. Flight plans will more accurately reflect the trajectories flown. One targeted CFSPs, Jeppesen, responded in support of the consultation. This supports Design Principle 8 - the proposed FRA airspace will be consistent with the requirements of airline operators and flight planning service providers. Jeppesen[9] raised a concern in their consultation response that the Consultation document had not presented the views of Brest ACC. Post consultation engagement with Jeppesen clarified that NATS are the sponsor of this ACP, with Brest ACC a key stakeholder who have been engaged with throughout and who were responding to the consultation. Jeppesen have since confirmed this is no longer a concern.

National Air Traffic Management Advisory Committee (NATMAC) members

8.10. Three responses were received from targeted NATMAC stakeholders: British Gliding Association (BGA), BALPA (British Airline Pilots Association) and GATCO (Guild of Air Traffic Controllers). These were all in support of the proposal.

Military impact and consultation

8.11. The proposed FRA is not expected to have any impact on MoD operations. There are no SUA volumes within the region, however, the 2,000ft buffer required[10] between the upper limit of EG D008A (22,000ft)) and the lowest flight plannable free route trajectory (FL250) where the proposed FRA volume overlaps the SUA has been considered and the proposed procedural solution consulted upon. The MoD have stated that the proposal will have no impact to their operation.

8.12. Design Principle 5 (DP5) stated that the FRA airspace will be compatible with the requirements of the MoD and take into consideration the requirements of defence industry stakeholders. The MoD (DAATM) responded to the consultation on behalf of the MoD expressing no preference to the design options as neither would impact on MoD operations.

[8] The consultation targeted the stakeholders listed in Annex 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.

[9] The consultation response from Jeppesen was the only stakeholder feedback that required post consultation engagement.

[10] To comply with CAA Special Use Airspace – Safety Buffer Policy for Airspace Design Purposes

General Aviation airspace users' impact and consultation

8.13. There is not expected to be any impact on general aviation or sport aviation airspace users. There is no Design Principle that specifically considers General Aviation because the existing airspace is Class C, FL245 and above, and wholly over the sea. The BGA responded to confirm they had no design preference, and there would be no impact on their operations from this proposal.

Commercial air transport impact and consultation

8.14. There is expected to be a positive impact on the operations of commercial airlines. 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. Because of the flight planning flexibility which FRA will facilitate, and how the airlines will choose to utilise this, it is hard to predict and quantify the benefits to airlines with certainty.

8.15. Design Principle 8 states that the proposed FRA airspace will be consistent with the requirements of airline operators and flight planning service providers. BALPA has replied to the consultation in support of the proposal, and states that these free routings are very welcome to flight planning. Three airlines (Gulf Air, American Airlines, United Airlines) responded in support of the proposal, with United Airlines commenting that they welcome the change.

CO_2e environmental analysis impact and consultation

8.16. 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.

8.17. CO_2e emissions & fuel burn analysis has been performed using computer simulations which modelled the operation of the FRA D2.1 airspace. The results of this modelling indicate that the proposed changes will result in an enabled reduction in average fuel burn and CO_2e emissions per flight.

8.18. As indicated in Stage 4A Update Design, there are no proposed changes to the airspace design as a result of the consultation, due to the supportive and neutral responses received from stakeholders. Therefore the forecast benefit remains the same as detailed in the Full Options Appraisal (Ref 11), and is presented within the Final Options Appraisal document (Ref 13) in line with CAP1616 guidance (Appendix F, para 14) that all environmental assessment requirements should be consistent with the information presented throughout the engagement and consultation.

8.19. CAP1616 also states that the CAA expects the change sponsor to use the most up-to-date and credible sources of data (paragraph E11). Since the submission of the consultation material to the CAA, NATS has produced an updated forecast that has considered the impact of the COVID-19 pandemic. This has been included in this submission in order to provide the most up to date and credible data, in accordance with CAP1616 para E11.

8.20. The NATS Analytics team have completed a final environmental analysis on the proposed changes presented here. Table 6 shows the forecast enabled fuel burn and CO_2e emission differences for the proposed changes in the first full year of implementation (2022) and ten years after (2032) (2020 Traffic forecast).

Year	Annual Fuel Burn Change (T)	Annual CO_2e Change (T)	Average Fuel Burn Change per Flight (kg)
2022	-505	-1,606	-22
2032	-695	-2,209	-22

Table 6 Forecast enabled fuel burn and CO_2e emission savings

8.21. This analysis concludes that in the first year of implementation there would be an enabled annual saving of 505 tonnes of fuel, and 1,606 tonnes of CO_2e. This benefit is the result of shorter average routes due to direct great circle routes in the Deployment 2.1 Free Route Airspace. The additional benefit of reduced fuel uplift and reduced CO_2e emissions due to the corresponding weight reduction

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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[11].

8.22. A UK government transport analysis, known as 'WebTAG', has been completed in order to quantify the monetary value of the impact on the environment due to greenhouse gas emissions (specifically using CO_2e as the measure). Details of the WebTAG results are given in the Stage 4 Options Appraisal (Phase 3 – Final) document (Ref 13).

Local environmental impacts and consultation

8.23. The changes proposed impact flights above 24,500ft. This is well above the 7,000ft threshold stipulated by the Department for Transport (DfT), above which overflights are deemed to have no significant impact on stakeholders on the ground. In addition all the proposed changes are wholly over the sea and therefore, they are assessed to have no change to noise, visual intrusion or tranquillity and no change in impact to stakeholders on the ground due to any of the proposed FRA change options.

Economic impacts

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

8.25. There is no forecast increase in air transport movements, passenger numbers or cargo carried as an outcome of this proposal. The flight-plan options FRA enables 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.

8.26. The impact on the Sponsor (NATS) for the cost of implementation of the change is expected to be minimal, in line with the normal AIRAC process. The overall cost estimate for the ANSP to complete the adaptation of systems and the airspace change process is estimated to be £320,000. There are no other known costs or additional training costs outside of usual AIRAC processes.

8.27. As calculated in the WebTAG spreadsheet provided (Ref 14), the WebTAG analysis concluded the Net Present Value of the reduction of CO_2e emissions would be £464,673. Additionally, the predicted decrease in fuel burn, would yield a saving of £142,592 p.a. in 2022, increasing to become a saving of £196,099 p.a. in 2032 (both Net Present Value).

8.28. This was based on the IATA jet fuel price of 16 November 2020, at $362 USD per tonne converted to GBP at 0.78$/£ and presumes a constant fuel price and exchange rate.

Analysis of Options

Airspace Change Design Options

8.29. Paragraph 7.9 describes the design constraints associated with this proposal. Due to these constraints, the EU mandate[12] the CAA AMS requirement to introduce FRA, and that the introduction of FRA is an agreed strategic aim of the European Commission Single European Sky Initiative, NATS' options on how to implement delivery are limited. Equally, the methodologies required by the European Network Manager to ensure consistency across all States, as well as agreements reached as part of the Borealis Alliance, constrain viable options.

8.30. The baseline (do nothing) option was discounted during the design principles evaluation. It would not deliver any benefit or meet the mandated legal requirement to introduce FRA in the UK UIR.

[11] Fuel burn is converted to CO_2e emissions using the ratio 3.18. Due to the uncertainty regarding how operators will react and flight-plan within FRA, a conservative approach has been taken and simulated forecast savings have been halved to these figures.

[12] It should be noted that some of the legal requirements to implement FRA originate in EU law. It is NATS' position that due to wider commitments (eg Borealis Alliance) and the CAA Airspace Modernisation Strategy, it is the intention to introduce FRA regardless of the withdrawal of the United Kingdom from the European Union (EU) on 31 December 2020.

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8.31. The two options which could be used to implement FRA in this region in accordance with the mandated requirements are:

- FRA Option 1. Remove all ATS routes and rationalise waypoints in accordance with the DSNA Brest ACC FRA design in both the PEMAK Triangle and the TAKAS Box.
- FRA Option 2. Remove all ATS routes and rationalise waypoints in accordance with the DSNA Brest ACC FRA design in the PEMAK Triangle but retain ATS routes in the TAKAS Box.

8.32. For each of the Options, the Irish and French RAD will be updated and used to manage the flow of traffic transitioning into and out of FRA.

8.33. 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. The removal of routes in the TAKAS Box provides a consistent FRA design throughout the airspace in which the IAA Shannon ACC provide the ATS. Furthermore, this option is consistent with the Borealis FRA concept and the removal of ATS routes is consistent with EUROCONTROL guidance.

Design Options Assessment

8.34. NATS undertook a Full Options Appraisal on the options (Ref 11) which quantified the analyses required by CAP1616. Subsequently, both options were progressed to consultation. The consultation received no responses which had a potential impact on the proposed design. A full summary of the consultation (Ref 10) and the feedback received (Ref 12) are described in the associated references.

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

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 7 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 7 and details contained within Appendix 1 and supporting documents.
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.	Special Use Airspace – Safety Buffer Policy for Airspace Design Purposes' has been applied procedurally – see details in section 7.
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 13)
f	Analysis of the impact of the traffic mix on complexity and workload of operations	Not applicable – no change to traffic mix is expected as a result of this proposal.
g	Evidence of relevant draft Letters of Agreement, including any arising out of consultation and/or airspace management requirements	See Draft LoAs (Appendices 3-4)
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). This proposal delivers the aims of the AMS whilst also meeting CAA, ICAO and EUROCONTROL Network Management requirements. See Appendix 1.
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.
k	Details of and justification for any delegation of ATS	No change to the delegation of ATS

9. Safety Assessment

9.1. NATS has a Safety Manager and a Human Factors Specialist for the FRA project. Their role is to assess the scale of each airspace change, to ensure the CAA-compliant NATS Safety Management System is followed. In addition, their role is to submit safety arguments with supporting evidence to the CAA's en-route safety regulator, to clearly demonstrate each airspace change is acceptably safe for implementation and the right assurances are in place.

9.2. A HAZARD Identification Safety workshop was undertaken. The output of this is that no safety issues or hazards have been identified as a result of this proposal in airspace where NATS provides the ATS (see Appendix 5).

9.3. NATS' Human Performance Specialist for the FRA Programme 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. No human performance issues have been identified as a result of this proposed airspace change.

9.4. The IAA and DSNA follow their own State regulatory safety processes, which are ultimately regulated by EASA (European Union Aviation Safety Agency).

Conclusion

9.5. The safety and human performance assessments undertaken to date indicate that nothing is presently foreseen which would have the potential to preclude 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. Impact to OAT is minimal in line with the Consultation response from the MOD. There is no change to VFR GA traffic as a result of this proposal.
b	Impact on VFR operations (including VFR routes where applicable);	No change - FRA D2.1 is wholly contained within Class C Airspace. See UK AIP 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	Not applicable – there is no change to SIDs, STARs, and/or holding patterns as a result of this proposal.
d	Impact on aerodromes and other specific activities within or adjacent to the proposed airspace	FRA is established above FL245. Arrival and Departure Connecting Points are not proposed within this FRA deployment
e	Any flight planning restrictions and/or route requirements	Flight planning restrictions above FL245 will be managed in the RAD and are therefore are out of scope of the CAP1616 process. See Section 7

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	Not applicable – no Navigation specification associated with FRA
b	Evidence to support primary and secondary surveillance radar (SSR) with details of planned availability and contingency procedures	No change from today. DSNA and IAA surveillance cover provides better coverage than that available to NATS and is a key consideration in the ATS delegation arrangements. 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 perspective. Demonstrably adequate for the region. For contingency arrangements see respective LoAs.
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 respective LOAs
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	Not applicable - 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	Responsibility to provide ATS delegated to IAA and DSNA. Refer to LoAs.

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 D2.1 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 change - FRA D2.1 is wholly contained within Class C Airspace. Safety Buffer Policy for Airspace Design Purposes has been applied. See paragraph 7.21.
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	No change to ATM system as a result of this proposal.
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	Not applicable FRA is wholly contained with Class C airspace, as notified
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. Refer to respective LoAs
h	The notification of the implementation of new airspace structures or withdrawal of redundant airspace structures shall be adequate to allow interested parties sufficient time to comply with user requirements. This is normally done through the AIRAC cycle	This change will be promulgated with a double AIRAC cycle, in line with Eurocontrol guidance.
i	There must be sufficient R/T coverage to support the Air Traffic Management system within the totality of proposed controlled airspace	Traffic uses the same regions as today in a similar manner from a comms infrastructure perspective. Demonstrably adequate for the region. See item 12c.

	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	Not applicable, FRA is wholly contained with Class C airspace, as notified. Adjacent state agreements are provided in Appendices 3-4
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	Not applicable, FRA is wholly contained with Class C airspace.

	ATS route requirements	Evidence of compliance/ proposed mitigation
1.	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	All ATS routes removed. See Appendix 1
2.	Where ATS routes adjoin terminal airspace there shall be suitable link routes as necessary for the ATM task	Not applicable, there is no FRA Arrival or Departure connectivity within the proposed FRA region.
c	All new routes should be designed to accommodate P-RNAV navigational requirements	Not applicable, there are no ATS routes proposed within the FRA volume.

	Terminal airspace requirements	Evidence of compliance/ proposed mitigation
	Not applicable – the proposed FRA volume does not change any terminal airspace requirements.	

	Off-route airspace requirements	Evidence of compliance/ proposed mitigation
	FRA is wholly contained in Class C Airspace.	

13. Environmental Assessment

	Theme	Content	Evidence of compliance/ proposed mitigation
a	WebTAG analysis	Output and conclusions of the analysis (if not already provided elsewhere in the proposal)	See Stage 4 Final Options Appraisal (Ref 13) and WebTag Excel file
b	Assessment of noise impacts (Level 1/M1 proposals only)	Consideration of noise impacts, and where appropriate the related qualitative and/or quantitative analysis If the change sponsor expects that there will be no noise impacts, the rationale must be explained	N/A – environmental analysis requirements scaled equivalent to a Level 2 change.
c	Assessment of CO2e emissions	Consideration of the impacts on CO2e emissions, and where appropriate the related qualitative and/or quantitative analysis If the change sponsor expects that there will be no impact on CO2e emissions impacts, the rationale must be explained	See Section 8.21
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 Section 8.20 and Final Options Appraisal (Ref 13).
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 Section 8.16-8.23.

Reversion Statement

13.1. 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.

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

13.3. 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.

14. References

14.1. The following documents support the contents of this document and are referred to throughout.

Ref No	Description	Notes
1	FRA D2.1 CAA Web page – progress through CAP1616	Link
2	Airspace Modernisation Strategy CAP1711	Link
3	Implementing Regulation EU716/2014	Link
4	UK Aeronautical Information Publication (AIP)	Link
5	Stage 1 Design Principles	Link
6	Stage 2 Design Options	Link
7	Stage 2 Design Principle Evaluation	Link
8	Stage 2 Initial Options Appraisal and Safety Assessment	Link
9	Stage 3 Consultation Strategy	Link
10	Stage 3 Consultation Document	Link
11	Stage 3 Full Options Appraisal	Link
12	Stage 3 Consultation Response Document	Link
13	Stage 4 Step 4A Final Options Appraisal	Link
14	Borealis Free Route Airspace Concept of Operations v1.0	

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:

No.	Title	Description	Notes
1	Draft AIP Changes	Summarises draft AIP changes both administrative and technical.	Published on portal
2	CAA Aeronautical Data Spreadsheet	In support of Appendix 1, Aerodata Spreadsheet provided with deletion and removal of ATS routes and waypoints.to support FRA D2.1	Supplied separately (NO PUBLISH)
3	Draft LoA Shannon	Draft Letter of Agreement to define the co-ordination procedures to be applied between London Area Control (Swanwick) and Shannon Air Traffic Control Centre (SATCC)	Supplied separately (NO PUBLISH)
4	Draft LoA Brest	Draft Letter of Agreement to define the co-ordination procedures to be applied between London Area Control (Swanwick) and Centre En Route de la Navigation Aérienne Ouest (BREST)	Supplied separately (NO PUBLISH)
5	HAZID report	L6260 FRA D2.1 HAZID Report	Supplied separately (NO PUBLISH)

16. Annex 1 List of Stakeholders

16.1. These specific organisations were targeted during consultation for this proposal.

Airlines

Aer Lingus	Eastern Airways	Qatar Airways
Air Canada	EasyJet	Ryanair
Air France	Emirates	SAS
Air New Zealand	Etihad	Saudia
American Airlines	FedEx	Stobart Air
Austrian Airlines	FinnAir	Tag Aviation
BA Cityflyer	Gamma Aviation	Thomson/ TUI
BAR	Gulf Air	Turkish Airlines
British Airways	Iberia	UK Air Tanker
Cityjet	Jet2	United Airlines
Cargolux	KLM	Virgin Airlines
DHL	Lufthansa	WizzAir

Air Navigation Service Providers (ANSPs)

Direction des Services de la Navigation Aérienne (DSNA) (France)	Eurocontrol Central Flow Management Unit (CFMU)
DSNA ACC Brest (France)	Irish Aviation Authority (IAA) (Ireland)
DSNA ACC Reims (France)	RAF(U) Swanwick (UK Royal Air Force)

Data Houses/ Computer Service Flight Planning Providers

Air Support	Jeppesen
Aviation Cloud	Lufthansa Systems
Flight Keys	NavBlue
Lido	Sabre

NATMAC Members

Aviation Environment Federation (AEF)	British Helicopter Association (BHA)
Airport Operators Association (AOA)	European UAV Systems Centre Ltd
Aircraft Owners & Pilots Association (AOPA UK)	General Aviation Safety Council (GASCo)
Association of Remotely Piloted Aircraft Systems (ARPAS UK)	General Aviation Alliance (GAA)
British Airways (BA)	Guild of Air Traffic Control Officers (GATCO)
British Aerospace Systems (BAE Systems)	Helicopter Club of Great Britain (HCGB)
British Airline Pilots Association (BALPA)	Heathrow Airport Ltd (HAL)
British Air Transport Association (BATA)	Heavy Airlines
British Balloon & Airship Club (BBAC)	Honourable Company of Air Pilots
British Business & General Aviation Association (BBGA)	Light Aircraft Association (LAA)
British Gliding Association (BGA)	Light Airlines
British Hang Gliding & Paragliding Association (BHPA)	Low Fares Airlines (LFA)
British Microlight Aircraft Association (BMAA)	Ministry of Defence (MoD) via the Defence Airspace and Air Traffic Management (DAATM)
British Model Flying Association (BMFA)	PPL/ IR

Other

Direction de la Sécurité de l'Aviation Civile (DSAC)	Irish Aviation Authority Regulator
Direction du Transport Aérien (DTA)	Irish Air Corps
French Air and Space Force	United Kingdom Space Agency (UKSA)

End of document