

Free Route Airspace
Deployment 1

Gateway documentation:
Stage 4 Submit

Step 4A Update Design:
Consultation Response Document

NATS Unclassified

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Issue 1.0	Dec 2020	Submitted to CAA for publication
Issue 1.1	Jan 2021	Footnote added (Page 7) describing methodology for FRA Arrival and Departure points.

References

Ref No	Description	Hyperlinks
1	FRA 3D Collate and Review Responses document	Link

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1. Introduction

1.1 This document forms part of the document set required in accordance with the requirements of the CAP1616 airspace change process.

1.2 This document aims to provide adequate evidence to satisfy Stage 4, Step 4A Update design

2. Consultation Responses

2.1 NATS completed a focused thirteen-week consultation on Free Route Airspace (FRA) across the majority of the Scottish Upper Information Region (UIR). The consultation closed on 18th December 2019 and received thirty-two responses in total.

2.2 A summary and theming of the responses can be found in the Categorisation Report ^(Ref 1).

2.3 This complies with the CAP1616 “We asked, you said, we did” consultation approach. The Categorisation Report ^(Ref 1) details the “We asked, you said”; whilst this document covers the “You said, we did” aspect.

2.4 As described in the Categorisation Report ^(Ref 1), there were two issues which were identified as having a potential impact on the final proposed design. The purpose of this document is to demonstrate how these have been considered for the design and to outline any proposed changes as a result.

3. Design Change Log

3.1 **Topic 1:** One stakeholder suggested the introduction of a vertical buffer zone for transition in order to ensure continuous climbs/descents are factored into the proposed design.

Summary of Issue:

Option 1. To allow seamless continuous climbs/continuous descents into and out of FRA, consideration should be given to a vertical buffer where the UK RAD will allow either directs or Airways to be used. The vertical buffer zone could be considered more of an option for Eurocontrol rather than any proposed change to the upper/lower split of the airspace so that an FPL submitted with either an Airway or a DCT would be accepted within this area.

- At or below FL245 – Low Level Airways to remain permanently in place.
- FL245 > FL265 – “Buffer Zone” DCT (FRA) or AWY can be filed to avoid Rejects and/or Step Climb/Descents. Essentially this would continue with Option 3 within this window.
- FL265 and above – Only DCT (FRA) is possible.

Potential impact on the proposal:

The introduction of a buffer zone for transition. The alternative to this is where each designated point is required to be filed prior to entry into FRA.

Outcome and Final NATS Response:

This has been explored with EU Network Manager (NM) to determine any potential changes to design. This model was used in Italy; however, it is not in line with removing routes or publishing Arrival/Departure points as proposed by NATS. This is not the model advocated by the EU NM or in line with our Borealis commitments.

Therefore, no design changes are proposed as a result of this.

3.2 Topic 2: Use of 5LNC at NAVAID locations

The consultation asked for a view on whether 5LNC waypoints should be co-located at NAVAID locations, to ensure unique FRA identifier points, which is a solution recommended by EuroControl in the FRA Design Guidelines.

There were 30 responses to this, and 13 comments provided. Given the mixed feedback provided, in the Categorisation Report (^{Ref1}) NATS proposed to revise the co-location concept in order to address the five principle issues which were identified, and this is detailed further here.

There are 14 3LNCs affected by Deployment 1 of Free Route Airspace. These are shown in Table 1, along with their Lower Route associations.

DVOR/DME	3LNC	Position	Lower Route Association	DVOR/DME	3LNC	Position	Lower Route Association
Aberdeen	ADN	571837.62N 0021601.95W	P600 Y904 Y905 P18	Saint Abbs	SAB	555427.04N 0021222.81W	Nil
Belfast	BEL	543940.12N 0061347.67W	N34 L10 P6	Stornoway	STN	562935.56N 0065232.12W	Y906
Benbecula	BEN	572840.57N 0072155.08W	Nil	Sumburgh	SUM	595243.34N 0011711.49W	Y905
Glasgow	GOW	555213.81N 0042644.60W	L602 L612 N560	Tiree	TIR	562935.56N 0065232.12W	L602
Isle of Man	IOM	540400.72N 0044548.51W	L10 L603	Wick	WIK	582731.74N 0030601.33W	N560 Y904
Machrihanish	MAC	552548.08N 0053901.49W	N562 N552	Talla	TLA	552956.92N 0032110.20W	N864 N601 Y96 N97 L602
Perth	PTH	562632.63N 0032206.96W	P600	Turnberry	TRN	551848.28N 0044701.89W	P600 N562 L186

Table 1: 14 3LNC affected by Deployment 1 Free Route Airspace

The table below presents a summary of each of the 5 issues, and the effect on the proposed solution.

Summary of Issue		Outcome and Final NATS Response
2a	To address the EU Network manager recommendation to all ECAC States to remove or collocate 5 /3 letter name codes as current flight plan acceptance systems are unable to differentiate between Nav aids having identical 3LNCs.	Where 3LNCs produce a conflict with neighbouring States, agreement will be made between the States and EU Network Manager not to publish these as FRA points. It is identified that only 2 of these 3LNCs produces a conflict with neighbouring States (SUM – Denmark; and BEL- Sweden). See Technical Annex 1.1 for diagram. Agreement has been reached with EU Network Manager, Sweden and Denmark that neither countries shall publish BEL or SUM as FRA points.
2b	To address the issue of misunderstanding and potential garbling effect as a result of the potential dual use of both 5LNC and 3LNC points that would co-exist in the same position.	Additionally, where lower route connectivity is associated with such points the name of these points shall be changed to a geographically unique 5LNC point; thereby producing seamless flight plan connectivity between the FRA volume above and the route structure below.

	Summary of Issue	Outcome and Final NATS Response
2c	To address the current requirement to retain VOR/DME beacons for the purposes of Airfield related approach procedures as well as extant conventional Standard Instrument Departures that connect with existing lower route structures where the joining point is associated with a VOR/DME beacon.	<p>No published Standard Instrument Departure (SID) or Standard Arrival Route (STAR) dependencies associated to either BEL or SUM¹. (No procedures that connect from the airports to the lower route network and thus directly rely upon conventional procedures to produce flight plan connectivity to any associated routes). Belfast International and Sumburgh airfields have Instrument Approaches related to Navigational Beacon BEL or SUM in addition to RNP and NDB approach procedures.</p> <p>Belfast City only has NDB procedures which are not associated with the BEL Navigational Beacon.</p> <p>The introduction of FRA and associated requirement to amend 3LNCs within the en-route environment to 5LNC alternatives is not reliant on the removal of the navigational beacons themselves.</p> <p>As a result, the airfield related instrument approaches are unaffected by the change to the en-route structure².</p>
2d	To address the requirement to retain VOR/DME information for the purposes of positional fixing for RNAV 5 only equipped aircraft operating without GNSS.	<p>The implementation of FRA does not involve removing navigational beacons; BEL and SUM will be retained within the UK AIP (ENR 4.1) as sources of navigational data for the purposes of en-route RNAV 5 usage. RNAV5 non-GNSS equipped aircraft may continue to use VOR/VOR cross fixing as a methodology of establishing their position.</p> <p>See Technical Annex 1.2 for further details of proposed ENR 4.1 amendments for relevant VOR/DME beacons.</p>
2e	To mitigate as far as practicable the issue of multiple changes and geographical awareness whilst accepting that ICAO provided 5LNC may not be available that simply add 'EG' before the existing 3LNC.	<p>ICAO requires all new 5LNC are pronounceable in English, sufficiently geographically distant from potentially similar sounding points and the same point is not used elsewhere. These criteria limit the names that can be authorised for use.</p> <p>Consultation feedback proposed simply instigating EG prior to the existing 3LNC in use, to make a 5LNC. This would only be suitable if they met the above criteria. EGBEL and EGSUM already exist so cannot be used.</p> <p>From the available 5LNCs approved for use by ICAO the following have been selected: BEL – BELZU SUM – WAFIL</p> <p>Should points reside at the end of lower routes, amendments to lower route information contained within ENR 3.1 and 3.3 will be made accordingly. See Technical Annex 1.3 for detail for BEL and SUM.</p> <p>In addition, information contained within ENR 4.4 will be amended to reflect all FRA significant points along with their use and route connectivity. See Technical Annex 1.4 for further detail.</p>

¹ See UK AIP Aerodromes Section for Belfast City EGAC, Belfast Aldergrove EGAA and Sumburgh EGPB

² This methodology has already been successfully used at Inverness where the INS has been removed as a point on lower routes (N560 and Y906) and replaced with RIMOL, and at Newcastle where the NEW has been removed (P18 and Y96) and replaced with NATEB. In each case the navigational beacon is still used for airfield related instrument approach procedures.

4. Impact of COVID 19 (CV-19) upon System Delivery and FRA

4.1 Due to the impact of CV-19, the planned introduction of new ATC systems to manage and distribute flight plan data between ACCs and the Military, have been delayed. Following consultation with our customers, a key priority is to increase operational efficiency, as a result FRA will be deployed on current systems, enabling environmental and fuel benefit in line with the published consultation materials. This solution will require temporary flight planning limitations in order to both manage data exchange between ACCs and provide the Military with flight plan and contextual data. These limitations will be removed as soon as practically possible following introduction of new flight plan data management systems.

5. Revised Design

In the FRA and lower route environment, 2 current 3LNC navigation points (SUM and BEL) will be removed and replaced with 5LNC (WAFIL and BELZU).

No other changes are proposed for the Airspace Design as a result of the feedback to Consultation, and there are no other technical amendments proposed. The ACP submission document (Stage 4B) will describe all proposed changes in detail.

As this is a technical amendment with no safety or environmental impact, the Options Appraisal Document in Stage 3 remains valid.

Technical Annex

Technical Annex 1.1

2 of the 14 3LNCs are identified as producing a confliction with neighbouring States (SUM and BEL) as shown in Figure 1 below:

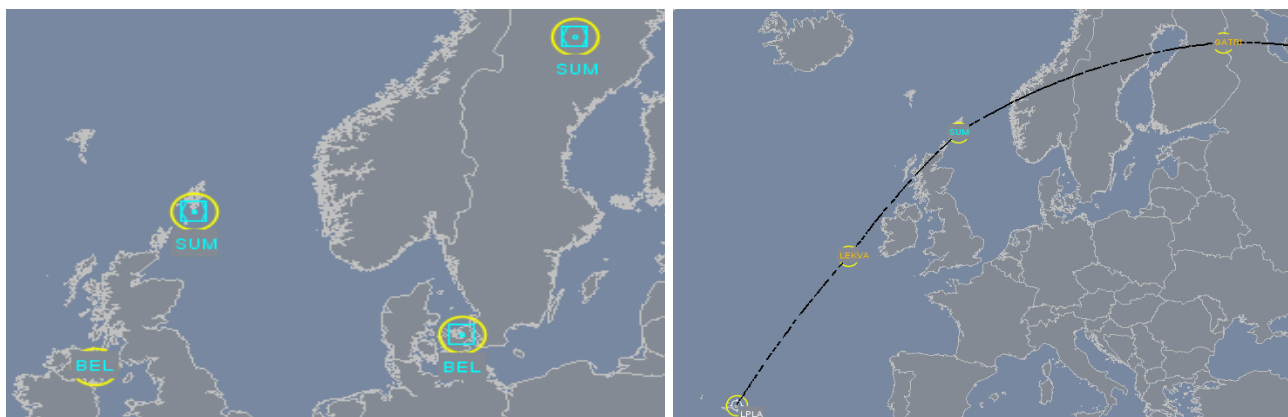


Figure 1. 3LNCs identified with EU Network Manager with neighbouring state conflict (SUM & BEL)

Technical Annex 1.2

Table 2 presents the proposed amendments within ENR 4.1 for all VOR/DME beacons associated to RNAV 5 requirements, their route connectivity where retained, and their FRA significance³ and usage.

Within FRA, name points shall be described as:

E = FRA Entry Point

X = FRA Exit Point

A = FRA Arrival Connecting Point

D = FRA Departure Connecting Point

I = FRA Intermediate Point

Name Code Designator	Co-ordinates	ATS Lower Route Connection	FRA Relevance	Remarks/ Usage
ADN Aberdeen	571837.62N 0021601.95W	P600, Y904, Y905, P18	IAD	A for: EGPA, EGPC, EGPE, EGPE, EGPN, EGPT, EGQL, EGPF, EGPH, EGPG, EGPK D for: EGPC, EGPE, EGPN, EGPT, EGQL
BEL Belfast	543940.12N 0061347.67W	Removed	Nil	No Route Connection
BEN	572840.57N	Nil	Nil	No Route Connection

³ Arrival (A) and Departure (D) points mark the vertical entry into FRA from specified airports. Arrival points are nominally positioned at each cardinal point relevant to the airfield, modified to connect to lower route structures and their orientation where they exist. The distance associated to the positioning a of (A) are calculated to achieve a 3⁰ decent profile from FL260 i.e., 300ft of decent per NM (optimum decent profile). However, this may be modified to consider existing standing agreements between upper and lower sectors, pre-existing STARS, contingency for holding arrangements and in the case of minor airfields the availability of reporting points. In reverse departure (D) points are calculated for a nominal 7% climb gradient to reach FL250 i.e., 425ft per NM (ICAO average climb gradient). However, this may be modified to consider existing standing agreements between upper and lower sectors, pre-existing SIDs and in the case of minor airfields the availability of reporting points. Where no point could be found to achieve the above, additional points have been created.

Benbecula	0072155.08W			
GOW Glasgow	555213.81N 0042644.60W	L602/ N560/ L612	IAD	A for: EGPI, EGPU D for: EGPI, EGP, EGPT, EGPU, EGQL
MAC Machrihanish	552548.08N 0053901.49W	N562/ N552	IAD	A for: EGEO, EGPF, EGPG, EGPU, EGAA, EGAC, EIDL, EGNC D for: EGEO, EGPF, EGPG, EGPU, EGAA, EGAC, EIDL, EGNC
IOM Isle of Man	540400.72N 0044548.51W	L10/L603/Y911	I	
PTH Perth	562632.63N 0032206.96W	P600	IAD	A for: EGEO, EGNC D for: EGPD, EGPK, EGEO, EGNC
SAB St Abbs	555427.04N 0021222.81W	Nil	I	No Route Connection
TLA Talla	552956.92N 0032110.20W	UN864/ N601/ Y96/ N97/L602/UN601/UN864	EXAD	X ODD FL A for: EGNT, EGNV D for: EGNT, EGNV
STN Stornoway	581225.01N 0061058.97W	Y906	IAD	A / D for: EGPE, EGPL, EGPU, EGEO A for: EGQS
SUM Sumburgh	595243.34N 0011711.49W	Removed	Nil	No Route Connection
TIR Tiree	562935.56N 0065232.12W	L602	IAD	A / D for: EGPU, EGEO, EGAE
TRN Turnberry	551848.28N 0044701.89W	P600/ N562/ L186	IAD	Mandatory Intermediate point for EIDW/EIME/EIWT Arrivals from the North East must route TRN DCT BLACA A for: EGAA, EGAC, EGAE, EGNS, EGP, EGPT, EGQL D for: EGAA, EGAC, EGAE, EGNS, EGPH
WIK Wick	582731.74N 0030601.33W	N560/ Y904	IAD	A for: EGPD, EGPE, EGPO D for: EGPD, EGPE

Table 2: Proposed amendments to ENR4.1 for relevant VOR/DME beacons

Technical Annex 1.3

As both BEL and SUM reside at the end of lower routes, amendments to lower route information contained within ENR 3.1 and 3.3 will be amended accordingly, as shown below for BELZU and WAFIL. This table shows the amendments for ENR 3.1 and 3.3; the diagram shows route connectivity

Route Amendment									
Route Designator	Insert Point	Co-Ordinate	Remove Point	Co-Ordinate	Level Change Point	Level Amendment	IFR Cruising Levels		Remarks
							Even	Odd	
L10	BELZU	543940N 0061348W	BEL	543940.12N 0061347.67W	N/A	N/A	N/A	N/A	ENR 3.3 Amend Note 19 FRA EX

N34	BELZU	543940N 0061348W	BEL	543940.12N 0061347.67W	N/A	N/A	N/A	N/A	ENR 3.3 Remove Note 4
P6	BELZU	543940N 0061348W	BEL	543940.12N 0061347.67W	N/A	N/A	N/A	N/A	ENR 3.3 Delete Note 5 (DRA Fix)
Y905	WAFIL	595244N 0011712W	SUM	595243.34N 0011711.49W	N/A	N/A	N/A	N/A	ENR 3.1

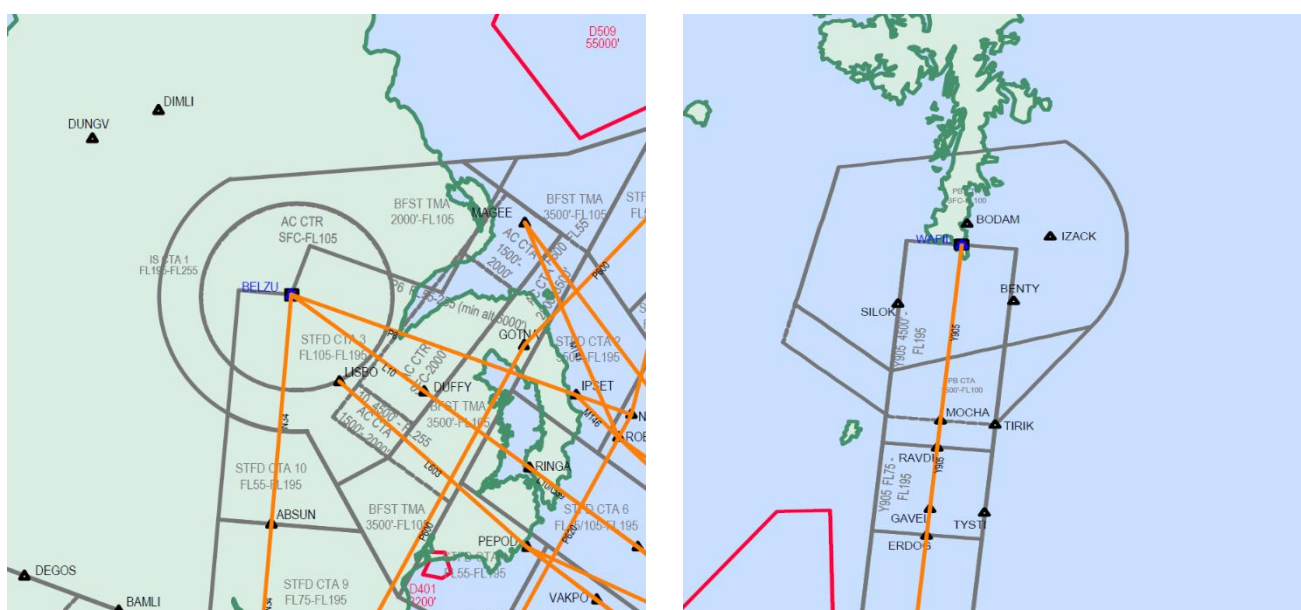


Figure 2: ATS Route connectivity for BELZU and WAFIL

Technical Annex 1.4

Proposed amendments to ENR 4.4 to reflect all FRA significant points along with their use and route connectivity. An example for BELZU and WAFIL:

Name Code Designator	Co-ordinates	ATS Lower Route or Other Route Connectivity	FRA Relevance	Remarks/ Usage
BELZU	543940N 0061348W	N34/ L10/ P6	IAD	A / D for: EGNS, EIDW, EGPI
WAFIL	595244N 0011712W	Y905	IAD	A / D for: EGPA

End of document