DVOR Rationalisation – PTH–
RNAV Amendment

Stage 4 Update and Submit
Step 4B

Airspace Change Proposal
V1.0

NATS Unclassified

Action	Position	Date
Produced	Airspace Change Assurance, NATS Future Airspace & ATM	May 2021
Approved	ATC Lead – Manager Systemised Airspace Prestwick Centre	May 2021
Approved	Project Manager L4017 DVOR	May 2021
Approved	Head of Operational Development Airspace	May 2021

Publication history

Issue	Month/Year	Change Requests in this issue
Issue 1.0	May 2021	Submitted to CAA

1. Contents

2. Introduction

The intent of this document is to summarise and satisfy the requirements of CAP1616 Stage 4: Update Design and submit Airspace Change Proposal (ACP) to the CAA. The CAA reference is ACP-2020-079, the link to the CAA portal page is here.

NATS operates 46 Doppler Omnidirectional Ranges (DVORs) and Non-Directional Beacons (NDBs) around the UK which are going through the first batch of rationalisation as part of NATS' DVOR Rationalisation Program. This is due to the DVORs operating well beyond their design life and no longer being needed due to RNAV5 (Area Navigation – 5 NM) mandated Air Traffic Service (ATS) routes since 2009. This extended period of use has created continued and unnecessary maintenance costs; as well as impacting upon airport development work prevented by safeguarding the radio Navigation Aids (NavAids).

Within the UK, there are several en-route Instrument Flight Procedures (IFPs) which are dependent on these NavAids. As a number of these are scheduled to be removed from service, the en-route IFP definitions require updating so they no longer refer to the NavAids which are scheduled to be removed.

This ACP is primarily focused on the en-route IFPs, in the UK Aeronautical Information Publication (AIP), which reference the Perth (PTH) DVOR. The scope of this proposal is limited to a single Standard Terminal Arrival Route (STAR), (PTH 1G[1]) serving both Glasgow and Edinburgh airports, 2 UK ATS Routes (P600 & UP600) [2]; and Free Route Airspace (Due to be implemented December 2021) where NATS is the primary Air Navigation Service Provider (ANSP).

Airport-based procedures such as Standard Instrument Departures (SIDs) and Instrument Approach Procedures (IAPs) are not relevant to the en-route scope of this proposal. Relevant airport operators are separately developing their own equivalent procedures to mitigate the removal of the PTH DVOR.

As described in Section 8.2 below, there are several methods in which a STARs references to a navaid can be removed. As such, the PTH 1G STAR was evaluated in order to determine the most appropriate method in which to remove the PTH DVOR reference. This method improves the overall network connectivity, reduces duplication and accounts for the current usage levels.

If this change is approved by the CAA, we plan to implement this change not before AIRAC 05/2022.

3. Executive Summary

In support of the DVOR Rationalisation program, NATS has identified there are no AIP en-route dependencies on the PTH DVOR. There are three references (PTH 1G STAR, ATS routes P600 and UP600) to the PTH DVOR in the AIP. In order to remove the references to this NavAid, a list of five Design Principles (DPs) were created and used to assess the individual IFPs against. As covered fully in the Stage 1B document (Ref 4), a consistent set of DPs were envisaged to be used throughout the DVOR rationalisation project. These have been continually reviewed and were modified as part of the Brecon (BCN) DVOR rationalisation ACP (link to portal page) to ensure that they have remained relevant and incorporated improvements learnt from previous deployments.

[1] The PTH 1G STAR was introduced as part of the GOW DVOR ACP (ACP-2019-026). Although this STAR was introduced as an RNAV 5 procedure, PTH is referenced as a waypoint.

[2] This ACP affects UK ATS route P600 and UP600. UP600 is due to be removed as part of Free Route Airspace Deployment 1 (FRA D1), (ACP-2018-11) due to be implemented AIRAC 12/2021. FINDO is planned to be added to P600 as part of FRA D1. This ACP will remove PTH from UP600 and add FINDO to P600 if FRA D1 is not implemented as planned.

The Design Principle (DP1) with overriding priority is that the airspace change must "*maintain or enhance the current level of safety*". The Design Principle (DP2), driving this change is that none of the proposed technical changes would result in a change to flight behaviours. The remaining three Design Principles focus on techniques which could be used to remove the DVOR dependencies, using an appropriate standard of PBN and where appropriate, facilitate an optimised airspace design.

As described in the Stage 2 Gateway documentation (Ref 5), the following four separate design options were developed in order to remove the identified en-route IFP references to the PTH DVOR:

- *Option 0* (Do nothing): Retain all the STARs, holds and ATS Routes unchanged from today's AIP definition.
- *Option 1*: Using the CAA policies, replicate all relevant STARs and Holds using RNAV, exactly as defined in the AIP without considering any practicalities.
- *Option 2*: Examine the use of existing STARS, Holds and ATS Routes from a practical point of view, re-evaluate how they are used and how the network may be improved by rationalising/ truncating/ replicating them in a considered manner.
- *Option 3*: Remove all existing STARs, Holds and ATS Routes that refer to or use the PTH DVOR.

The five Design Principles were used to qualitatively assess each of the four design options (Ref 5). This process reduced the four design options down to one (Option 2) which is the preferred concept option presented here. Consultation regarding DVOR rationalisation was undertaken in 2008. Due to the technical nature of the changes which will not result in changes to flight paths, no further consultation has been required.

4. Current Airspace Description

The PTH 1G IFP, serving Glasgow and Edinburgh airports was introduced as a RNAV5 procedure in 2019. However, the reference to the PTH DVOR was not removed. This procedure is summarised in Table 1 below and the relevant charts can be found in the Stage 2 Gateway document (Ref 5).

Associated Airport	Current IFP	Current Routing
Glasgow/ Edinburgh	PTH 1G	P600: PTH-GRICE-STIRA

Table 1: Summary of current IFP

Two UK ATS routes reference PTH. FRA D1 (planned to be implemented AIRAC 12/2021) has a planned impact on these routes. These routes and FRA D1's planned impact on these routes is described in Table 2.

ATS Route	Current Routing	Planned Impact of FRA ACP
P600	ROTEV-GOTNA-BLACA-TUNSO-GIRVA-TRN-FENIK-GOSAM-GRICE-ENUKU-EDONU-PTH-ASNUD-GANKI-GLESK-NAXIL-ADN-OSLEL-LESNI-BUDON-OVDAN	FINDO added to route between PTH and EDONU
UP600	TRN-GOW-FINDO-PTH-ADN-LESNI-BUDON-OVDAN-FORTY-KLONN	Entire route removed

Table 2: Summary of impacted ATS Routes and the impact of FRA D1 on these routes.

FRA D1 also proposes to use PTH as an FRA Arrival point for Oban (EGEO), and Carlisle (EGNC) airports and as a departure point for Aberdeen (EGPD), Prestwick (EGPK), Oban, and Carlisle airports.

4.1 Structures and Routes

The full technical notes and associated charts for each of the above current IFPs, listed in Table 1, can be found in the Assessment Meeting slide pack (Ref 3).

4.2 Airspace usage and proposed effect

The proportions of aircraft, including fleet mix and operators, using any of the IFPs related to this project would not change as an outcome of the proposed changes. The proposed flight plan connectivity remains entirely unchanged due to RNAV truncation of the STAR; therefore, the usage would remain the same as today. The change to the PTH 1G STAR will lead to no change to pilot or controller behaviour, and no change to lateral or vertical traffic dispersion. Therefore, the airspace capacity, usage and current operation will stay the same as today. Network connectivity will be maintained for Glasgow departures flying the PTH SID by the addition of a DCT PTH - ASNUD to the Standard Route Document (SRD).

The PTH 1G will be truncated and serve both Glasgow and Edinburgh arrivals whilst maintaining existing important Descent Planning Levels (DPLs). Further information can be found in Sections 16.2 and 16.3 below.

Removal of the PTH DVOR from the enroute environment will impact on FRA D1 (if implemented) airspace. This ACP will update the FRA Arrival and departure points for Oban and Carlisle as well as the departure points for Aberdeen and Prestwick from PTH to a new 5LNC which is near located with PTH, named PERFE. This 5LNC has been reserved. This will maintain connectivity between the UK ATS route network and FRA.

4.3 Operational efficiency, complexity, delays and choke points

There are no specific issues relating to operational efficiency, complexity, delays or choke points associated with any of the IFPs related to this airspace change proposal.

4.4 Safety issues

There are no specific safety issues associated with any of the IFPs related to this airspace change proposal.

Ensuring the safety of the proposed changes is a priority for NATS. NATS has a dedicated safety manager for the DVOR Rationalisation Programme who ensures that the safety representatives from SARG have oversight of the safety assurance process. Section 10 contains further details on the safety assessment for this proposal.

4.5 Environmental issues

There are no specific environmental issues associated with any of the IFPs related to this project, to be solved by this airspace change proposal.

5. Statement of Need

The following text is taken from the DAP1916 Statement of Need submitted in 16th September 2020, Submission Number DAP1916V2-131 for this airspace change proposal.

Current Situation

P600 and UP600 route through the Perth (PTH) VOR.

PTH is scheduled to be removed from service as part of the VOR rationalisation programme. PTH has no co-located DME

Issue/opportunity to be addressed

PTH VOR is scheduled to be removed from service and hence the enroute dependencies on PTH must be removed in order to facilitate its removal safely.

Cause

VOR Rationalisation

6. Proposed Airspace Description

6.1 Objectives for Proposed Design

The primary objective for this proposed airspace design is to remove the enroute references to the PTH DVOR. If FRA is implemented as planned, this will be achieved by:

- Truncating the PTH 1G STAR to FINDO and renaming FINDO 1G;
- Replacing PTH on UK ATS route P600 with PERFE
- Replacing FRA departure point, PTH, for EGPK, EGPD, EGEO and EGNC with PERFE;
- Replacing FRA arrival and departure point, PTH, for EGEO and EGNC with PERFE.

If FRA D1 is not implemented as planned this ACP will additionally:

- Remove PTH from UP600;
- FINDO will be added to P600;
- There will be no requirement to replace the FRA D1 arrival and departure points.

Network connectivity will be maintained for Glasgow departures flying the PTH SID with the addition of a DCT PTH-ASNUD to the SRD.

These changes are in support of the NATS DVOR Rationalisation Program which aims to reduce the dependence on ground infrastructure without reducing en-route services.

6.2 Proposed New Airspace/ Route Definition and Usage

There is no predicted change to the current connectivity or flight behaviour as a consequence of this airspace change proposal. This means there would be no change to pilot or ATCO behaviour (apart from designation changes), and no change to lateral or vertical traffic dispersion on, nor any perceived impact on adjacent IFPs. The proposed changes will also not alter route usage or traffic mix within the associated airspace.

A full summary of all the proposed IFP changes and associate impacts can be found in in Sections 16.2 and 16.3 below. This details the impact assessment which was completed for the PTH 1G STAR where PTH is referenced. An impact assessment of UK ATS routes P600 and UP600 is included in Section 16.4. An impact assessment on FRA is included in Section 16.5.

Charts and technical notes on the PTH 1G STAR can be found in the Assessment Meeting slide pack (Ref 2). The proposed changes will not change the connectivity of the procedures from today meaning there will be no change to route usage or traffic patterns over the ground.

As part of this change the enroute PTH DVOR references will be removed from the AIP entry. An update to the UK AIP section GEN 2.5, ENR3.1, ENR3.3, ENR 4.1 and ENR 4.4 will be required to reflect this change.

The PTH DVOR will remain until Glasgow airport removes their dependencies. The definition of the PTH DVOR will be removed from UK AIP ENR 4.1 but will need to be added to the Glasgow airfield section of the AIP as the DVOR will continue to support SID procedures. This change will not introduce any changes to traffic patterns. The relevant current airspace structures, and AIP sections, which are associated with the PTH 1G STAR are listed in Table 3 below. AIP updates will be reviewed prior to implementation to ensure they remain appropriate to the change.

AIP Section	Comment	AIP Section
General	PTH will be amended	GEN 2.5
EN-route	P600 will be updated UP600 will be updated PTH will be removed from ENR 4.1, Radio Navigation aids and waypoints PERFE added to table of Name Code Designators for Significant Points FRA relevance of FINDO will be updated[Error! Bookmark not defined.]	ENR 3.1 ENR 3.3 ENR 4.1 ENR 4.4
Aerodrome	Glasgow SID description updated Glasgow airport charts, coding tables and text updated to reflect STAR Change Edinburgh airport charts, coding tables and text updated to reflect STAR Change	AD2. EGPF- 6-XX AD2. EGPF-7-XX AD2. EGPH-7-XX

Table 3: Current Relevant AIP Sections associated with Administrative Changes

The proposed procedure changes will not alter the traffic patterns or route usage, due to the truncation of the PTH 1G STAR. Further technical information on the proposed designs can be found in a document summarising the draft AIP changes and the associated AIP pages where these changes need to occur (Ref 7); alongside the NATS Design Procedure Design Report (Ref 8).

7. Impacts and Consultation

7.1 Net impacts summary for proposed route

Category	Impact	Evidence
Safety/Complexity	No impact on safety or complexity.	See sections 4.3, 4.4 and 10
Capacity/Delay	No impact on Capacity usage or delay	See sections 4.2
Fuel Efficiency/CO_2	No impact, there will be change to lateral or vertical tracks, nor to impact adjacent IFPs	See sections 4.5 and 7.7
Noise – Leq/SEL	N/a, this is a level 2C[3] change.	N/a
Tranquillity, visual intrusion (AONBs & National Parks)	N/a, this is a level 2C change.	N/a
Local Air Quality	N/a, this is a level 2C change.	N/a
Other Airspace Users	Minimal impact, no changes to volume or classification of airspace.	See sections 7.4 - 7.6

7.2 Units affected by the proposal

The changes described in this ACP will affect flights inbound to Edinburgh and Glasgow airports. Edinburgh and Glasgow Airports have been fully engaged throughout the project.

If FRA is introduced as planned in December 2021 Scottish area control will be impacted. PTH will be replaced as a FRA arrival and departure point by PERFE.

The proposed changes will require the update of the UK AIP as detailed in Table 3.

These changes will have no impact on the frequency, or impact on lateral or vertical dispersion of flights.

7.3 Consultation

NATS took part in a (CAA-led) consultation with the National Air Traffic Management Advisory Committee (NATMAC) in 2008. NATMAC members were provided with a consultation paper which outlined NATS plans to rationalise the DVOR infrastructure; alongside being invited to provide feedback or questions on the proposal. As this consultation was completed before the introduction of CAP1616, there was not a requirement for NATS to engage or seek feedback on Design Principles.

A follow-up informative letter was sent to NATMAC members in 2010 which summarised the results of the consultation; including broad support from airlines and a recognised requirement for airports to remove their own airport procedure dependencies. NATS, through the DVOR Rationalisation Project, also provided the

[3] The CAA agreed that this proposal falls under the airspace change process as a Level 2C proposal. This is a proposal which reflects the current use of airspace concerned 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.

NATMAC members with an update on the project in 2018; including an explanation of the stages required to remove the navaid dependencies and how they will be physically removed from service.

7.4 Military impact and consultation

No military airspace user stakeholders were identified as being impacted by the proposed changes. The changes are purely technical changes which will not lead to any material change to the current operation.

7.5 General Aviation airspace users impact and consultation

No GA stakeholders have been identified as being impacted by the proposed changes.

7.6 Commercial air transport impact and consultation

There would only be technical changes for commercial air transport such as nomenclature and FRA arrival/ departure points. There would be no impact to connectivity or flight behaviour, as there would be no change to lateral or vertical tracks, nor to impact adjacent IFPs.

No commercial air transport/ IFR stakeholders were identified as being impacted by the proposed changes; other than the nomenclature changes mentioned.

7.7 CO_2 environmental analysis impact and consultation

There would be no change in fuel, CO_2 or greenhouse gas emissions as a result of the proposed changes because there would no change to lateral or vertical tracks, or to impact adjacent IFPs. Fuel uplift changes are unlikely to occur. The actual fuel uplift is very difficult to quantify, however there is an established relationship between distance flown and the amount of fuel uplift. As this proposal will not impact the distance flown or vertical profile, we can deduce that the fuel uplift should not change.

This aligns with the Design Principle (DP1) which is driving this change, of ensuring that none of the proposed technical changes to IFP definitions result in any changes to actual flight behaviours.

7.8 Local environmental impacts and consultation

There would be no change in environmental impacts, such as noise or tranquillity or a change in the number aircraft overflights, as a result of the proposed changes because there would be no change to lateral or vertical tracks, nor any impact to adjacent IFPs.

Fuel uplift changes are unlikely to occur. The actual fuel uplift is very difficult to quantify, however there is an established relationship between distance flown and the amount of fuel uplift. As this proposal will not impact the distance flown or vertical profile, we can deduce that the fuel uplift should not change.

Design Principle 4 (DP5) stated that "*The proposed changes should minimise the impact on stakeholders, including ground-based stakeholders and other airspace users*" which this option meets.

7.9 Economic impacts

The cost to the ANSP (NATS) for implementation of the change and adaptation of systems is estimated to be approx. £65,000.

Removal of the enroute dependency enables decommissioning of the DVOR (once airfields have removed their dependencies i.e. SIDs). This will yield an annual cost saving of circa £10,000 per DVOR. However, the development of this ACP has not been motivated by economic constraints or opportunities.

8. Analysis of Options

8.1 Airspace Change Design Options

In order to remove the en-route IFP references from the PTH DVOR, NATS developed four separate design options on how best to adapt the UK airspace. The design options are described fully in the Stage 2 Gateway document (Ref 5).

The first considered option (Option 0), of doing nothing, would retain all the current STARs and ATS routes unchanged from today's AIP definition. Options 1, 2 and 3 involve making changes to today's AIP definition:

- Option 1: Using CAA policies, RNAV replicate STARs exactly as defined in the AIP without considering any practicalities.
- Option 2: Examine the use of existing STARs from a practical point of view, re-evaluate how they are used and how the network may be improved by rationalising/ truncating/ replicating them in a considered manner.
- Option 3: Remove all existing STARs and Holds that refer to, or use, the PTH DVOR.

8.2 Design Options Assessment

Design Principles have been created in order to assess the four design options. The previously submitted DVOR ACPs – which can be viewed on the CAA's online portal (link) – have all used a consistent set of Design Principles. As covered in the Stage 1B document (Ref 4), the Design Principles were reviewed and updated as part of this submission.

The Design Principles have been constructed around the general objectives for this airspace change proposal: removing the en-route dependencies from the PTH DVOR; maintaining or enhancing safety levels; and introducing no change to actual flight behaviour. For example, this ACP will remove any en-route references to the PTH DVOR.

There are an additional two principles which ensure that an appropriate standard of PBN is used and where appropriate, the proposed airspace will facilitate an optimised airspace design. For example, alongside removing the en-route references to PTH, this proposal will truncate the PTH 1G STAR whilst ensuring that current important descent planning levels are maintained and introducing no change to flight behaviour.

These five Design Principles ensure that the core objectives of the DVOR programme are met, whilst also enabling improvements to the enroute network (where appropriate and in alignment with the other principles). Alongside all previous DVOR ACPs, the overriding Design Principle (DP0) - with the highest priority - for this airspace change is that the proposed airspace change must "*maintain or enhance the current level of safety*".

The five Design Principles for this proposal are:

Design Principle	Description
DP1 Safety	The proposed airspace change must maintain or enhance the current level of safety
DP2 No change to flight behaviour	None of the proposed technical changes to definitions of STARS/ Holds would result in a change to actual flight behaviours – laterally, vertically or in dispersal
DP3 PBN Specification	The proposed airspace change will yield maximum safety and efficiency benefits by using an appropriate standard of PBN
DP4 Remove DVOR Dependencies	Remove enroute dependencies on the PTH DVOR through appropriate design changes; including removing unnecessary references to the PTH DVOR which are not material to the procedure, and rationalising rarely used STARs
DP5 Airspace Optimisation	Where appropriate, the proposed airspace will facilitate an optimised airspace design. Including: • Use PBN Replication – replacing conventional STARs/ Holds with RNAV STARs/ Holds; • Using CAA STAR Truncation Policy, when applied logically to STARs with many common segments, can result in the withdrawal of unnecessary duplicate STARs. • Minor changes to a STAR which currently cannot be flown as it is formally define for legacy reasons – these changes reflect what would actually happen in practice. • Extend or split a current STAR to allow important Descent Planning levels to be formally incorporated in the STAR description

Options Assessment using the Design Principles

The four Design Options outlined in Section 8.1 were qualitatively assessed against each Design Principle (listed above), in order to evaluate whether the principle had been met, partially met or not met. A full summary of the options assessment can be found in Section 2 of the Stage 2 Gateway document (Ref 5).

Option 0: do nothing, fully met three of the five Design Principals: DP1- maintain/ enhance the current level of safety, DP2- introduced no changes to flight behaviours and DP3- use an appropriate RNAV specification. Option 0 therefore does not achieve the removal of references from the PTH DVOR nor improve the network in any way; and has been rejected.

Option 1: replication of each STAR - As the PTH 1G STAR has previously been replicated, this option fully met three of the five Design Principals: DP1- maintain/ enhance the current level of safety, DP2- introduced no changes to flight behaviours and DP3- use an appropriate RNAV specification. However, Option 1 does not remove the refences to the PTH DVOR (DP4) nor would not evaluate procedures for potential further airspace optimisation opportunities (DP5) and has therefore also been rejected.

Option 2 involved an individual evaluation of the PTH 1G STAR. As this option is focussed on a flexible approach for removing any DVOR references, it was able to fully meet all the proposed Design Principles.

Although Option 3 removes the references to the PTH DVOR, thus meeting DP4 - as a consequence of removing all appropriate IFPs - it does not fully meet any of the additional four Design Principles: offering no network improvements but significant disruption. Option 3 was therefore rejected.

The conclusion of this assessment was to reduce the number of design options to one, known as Option 2 which best meets all the five Design Principles. This option removes the enroute references to the PTH DVOR whilst also maintaining current safety levels, introducing no change to flight behaviour, proposing an appropriate PBN specification.

9. 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	STARs, ATS Routes and FRA, see section 6
b	The hours of operation of the airspace and any seasonal variations	H24 (unchanged from today)
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	This proposal would not have any impact on current connectivity- See Sections 4.2 and 4.3
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.	N/A– this proposal does not change any existing/ introduce new buffers.
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	This proposal will have no impact on airspace usage – see Sections 4.2, 4.3 and 6.2.
f	Analysis of the impact of the traffic mix on complexity and workload of operations	This proposal will have no impact on traffic mix – see Sections 4.2, 4.3 and 6.2.
g	Evidence of relevant draft Letters of Agreement, including any arising out of consultation and/or airspace management requirements	N/A – this proposal does not change any existing/ introduce new LoAs
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)	STAR Replication policy and PANS-OPS compliance – see NATS design report (Ref 8).
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

10. Safety Assessment

10.1 There is an overriding safety Design Principle for the proposed changes which states that safety should be at least maintained, or improved, as an impact of the changes.

10.2 The safety of the IFP changes has been assured by NATS Design who have worked alongside the CAA SARG IFP Regulator.

10.3 Prior to implementation, NATS will also undertake a formal Hazard Analysis in order to prove that the proposed changes are safe to be implemented into the operational environment.

10.4 The Option 2 concept would take full account of existing usage and connectivity needs. It would ensure that all IFPs are designed and checked by a suitably qualified Approved Procedure Designer (APD), as regulated by CAA SARG.

10.5 The change relating to the FRA arrival and departure from PTH to PERFE has been coordinated with the FRA D1 team and no safety issues identified with this change.

10.6 Therefore, safety and the overall network connectivity will be maintained. This is dependent on the satisfactory completion of the hazard analysis.

11. 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	No impact to air traffic – see Sections 7.4 - 7.6
b	Impact on VFR operations (including VFR routes where applicable);	No impact to VFR Operation – see Section 7.4 - 7.5
c	Consequential effects on procedures and capacity, i.e. on SIDs, STARs, and/or holding patterns. Details of existing or planned routes and holds	PTH 1G will be redesignated FINDO 1G. See sections 6.1, 6.2, 7.2 and 7.5
d	Impact on aerodromes and other specific activities within or adjacent to the proposed airspace	No impact on aerodromes. See section 7.2
e	Any flight planning restrictions and/or route requirements	No impact to flight planning restrictions or route requirements

12. 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 Current RNAV5 coverage is demonstrably adequate
b	Evidence to support primary and secondary surveillance radar (SSR) with details of planned availability and contingency procedures	Traffic uses the same regions 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 today in a similar manner from a communications point of view. Demonstrably adequate for the region.
d	The effects of failure of equipment, procedures and/or personnel with respect to the overall management of the airspace must be considered	Contingency procedures and management protocol will continue to apply as today.
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	Contingency procedures and management protocol will continue to apply as today.
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	No training or additional qualifications required

	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	As today – no proposed changes to the airspace structure (technical changes only). See Section 6
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.	As today – no proposed changes to the airspace structure (technical changes only).
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	As today – no proposed changes to the airspace structure (technical changes only).
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	As today – no proposed changes to existing ATC procedures
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 classification.
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 existing 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 will 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	No new airspace structures. All changes will be promulgated through the AIRAC cycle.
i	There must be sufficient R/T coverage to support the Air Traffic Management system within the totality of proposed controlled airspace	No change from today's-controlled airspace. R/T coverage demonstrably adequate as per current day.
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	No proposed new airspace structures.
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	No proposed new airspace structures.

13. Airspace and Infrastructure

	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	No change from today's-controlled airspace. RNAV5 NavAid coverage is demonstrably adequate.
b	Where ATS routes adjoin terminal airspace there shall be suitable link routes as necessary for the ATM task	N/A no change to connectivity from today's operation
c	All new routes should be designed to accommodate P-RNAV navigational requirements	Confirmed- RNAV5 will be used

	Terminal airspace requirements	Evidence of compliance/ proposed mitigation
	There are no proposed changes to terminal airspace structures	

	Off-route airspace requirements	Evidence of compliance/ proposed mitigation
	There are no proposed changes to off-route airspace structures	

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)	N/A – This change will have negligible impact from today's operation. See Section 7.7
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 – this is a Level 2C change
c	Assessment of CO_2 emissions	Consideration of the impacts on CO_2 emissions, and where appropriate the related qualitative and/or quantitative analysis If the change sponsor expects that there will be no impact on CO2 emissions impacts, the rationale must be explained	N/A- no change in CO_2 or fuel impacts. See Section 7.7.
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 – this is a Level 2C 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 – this is a Level 2C 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	No change to environmental impacts as covered in sections 7.7 and 7.8
g	Traffic forecasts	10-year traffic forecasts, from the anticipated date of implementation, must be provided (if not already provided elsewhere in the proposal)	No foreseeable changes to capacity or usage - see Section 4.2
h	Summary of environmental impacts and conclusions	A summary of all of the environmental impacts detailed above plus the change sponsor's conclusions on those impacts	No foreseeable environmental impact. See sections 4.5, 7.7 and 7.8

15. Reversion Statement

15.1 Reversion Statement

Should the proposal be approved and implemented, reversion to the pre-implementation state would only be possible whilst the PTH waypoint exists (this will be removed when PTH DVOR is decommissioned). Once the PTH DVOR is removed it will not be possible to revert back to the pre-implementation state

The PTH DVOR is scheduled to be decommissioned and physically removed in 2022 or sooner if all aerodrome dependencies are removed before then.

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 Route Availability Document (RAD) restrictions. 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 usually only implemented four times a year.

16. Appendices

16.1 References

Ref No	Name	Hyperlink
1	PTH DVOR Statement of Need V1.0	Link
2	Stage 1 Assessment Meeting Presentation	Link
3	Stage 1 Assessment Meeting Minutes	Link
4	PTH DVOR Stage 1 Document V1.0	Link
5	PTH DVOR Stage 2 Document V1.1	Link
6	PTH DVOR Stage 3 Document V1.0	Link
7	AIP changes in support of PTH DVOR Airspace Change Proposal V1.0	Supplied directly to CAA
8	NATS Procedure Design Report	Supplied directly to CAA

16.2 Impact assessment: Glasgow Procedures

For charts and technical notes, see the Assessment Meeting slide pack (Ref 2) for the current IFPs.

Current IFP	Current route connectivity/ STAR	Design Principle	How	Proposed route Connectivity/ STAR	Impact of proposed change on connectivity and flight behaviour
PTH 1G	P600: *PTH– GRICE – STIRA*	Satisfies all 5 DPs	STAR Truncation and re-designation	(U)P600: ***FINDO***– *GRICE – STIRA* Re-named as **FINDO 1G**	Truncating the STAR to *FINDO* will maintain connectivity to UK ATS route network. STAR to be re-named based on its new starting waypoint *FINDO* and the 'G' designator used to denote the destination airport (Glasgow).

16.3 Impact assessment: Edinburgh Procedures

For charts and technical notes, see the Assessment Meeting slide pack (Ref 2) for the current IFPs.

Current IFP	Current route connectivity/ STAR	Design Principle	How	Proposed route Connectivity/ STAR	Impact of proposed change on connectivity and flight behaviour
PTH 1G	P600: *PTH– GRICE – STIRA*	Satisfies all 5 DPs	STAR Truncation and re-designation	(U)P600: ***FINDO***– *GRICE – STIRA* Re-named as **FINDO 1G**	Truncating the STAR to *FINDO* will maintain connectivity to UK ATS route network. STAR to be re-named based on its new starting waypoint *FINDO* and the 'G' designator used to denote one of the destination airports (Glasgow).

16.4 Impact assessment: UK ATS Routes[Error! Bookmark not defined.]

For charts and technical notes, see the Assessment Meeting slide pack (Ref 2) for the current IFPs.

Current Route Name	Current route	Proposed Route Name	Proposed Route	Notes	Impact of proposed change on connectivity and flight behaviour
P600	*ROTEV -GOTNA - BLACA -TUNSO - GIRVA -TRN - FENIK -GOSAM - GRICE -ENUKU - EDONU -**PTH** - ASNUD -GANKI - GLESK -NAXIL - ADN -OSLEL - LESNI -BUDON - OVDAN*	Same – P600	*ROTEV -GOTNA - BLACA -TUNSO - GIRVA -TRN -FENIK -GOSAM -GRICE - ENUKU -EDONU – **PERFE** - **FINDO** - ASNUD -GANKI - GLESK -NAXIL -ADN -OSLEL -LESNI - BUDON -OVDAN*	**PTH** removed from route **PERFE** Added to the route **FINDO** Added to route	No impact to connectivity. No predicted change to flight behaviour.
UP600	*TRN - GOW – **PTH** - FINDO -ADN - LESNI -BUDON - OVDAN -FORTY - KLONN*	Same - UP600	*TRN – GOW - FINDO -ADN -LESNI -BUDON -OVDAN - FORTY -KLONN*	**PTH** removed from route	No impact to connectivity. No predicted change to flight behaviour.

16.5 Impact assessment: Free Route Airspace

FRA D1 is planned to be implemented in December 2021. Assuming FRA D1 is implemented, this ACP will make the following changes to FRA D1 Airspace

Proposed FRA Arrival Point	Proposed FRA Departure Point	Airports Served	Proposed New FRA point .	Impact of proposed change on connectivity and flight behaviour
PTH		Oban Carlisle	PERFE	No impact to connectivity. No predicted change to flight behaviour.
	PTH	Prestwick Aberdeen Oban Carlisle	PERFE	No impact to connectivity. No predicted change to flight behaviour.

16.6 List of Design Principles

The following five design principles were used to assess the design options against:

Design Principle (DP)	Priority
DP1: The proposed airspace change must maintain or enhance the current level of safety.	High
DP2: None of the proposed technical changes to definitions of STARS/Holds would result in a change to actual flight behaviours – laterally, vertically or in dispersal	High
DP3: The proposed airspace change will yield maximum safety and efficiency benefits by using an appropriate standard of PBN.	High
DP4: Remove en-route dependencies on the PTH DVOR through appropriate design changes; including removing unnecessary references to the PTH DVOR which are not material to the procedure and rationalising rarely used STARs.	High
DP5: Where appropriate, the proposed airspace will facilitate an optimised airspace design. Including: • Use PBN Replication –replacing conventional STARs/ Holds with RNAV STARs/ Holds; • Using CAA STAR Truncation Policy, when applied logically to STARs with many common segments, can result in the withdrawal of unnecessary duplicate STARs; • Minor changes to a STAR which currently cannot be flown as it is formally defined for legacy reasons –these changes reflect what would actually happen in practice; • Extend or split a current STAR to allow important Descent Planning levels to be formally incorporated in the STAR description.	Medium

16.7 Glossary

ACP	Airspace Change Proposal
AIP	Aeronautical Information Package
AIRAC	Aeronautical Information Regulation and Control
ANSP	Air Navigation Service Provider
ATC	Air Traffic Control
ATCO	Air Traffic Control Officer
ATM	Air Traffic Management
ATS	Air Traffic Service
CAA	Civil Aviation Authority
CAP	Civil Aviation Publication
CO_2	Carbon Dioxide
DAATM	Defence Airspace Air Traffic Management
DME	Distance Measuring Equipment
DP	Design Principle
(D)VOR	(Doppler) Very High Frequency Omnidirectional Range
EFPS	Electronic Flight Information System
FASI-N	Future Airspace Strategy Implementation- North
FLXXX	Flight Level XX
ft	Feet
GA	General Aviation
H24	24 Hours
ICAO	International Civil Aviation Organisation
IFP	Instrument Flight Procedures
IFR	Instrument Flight Rules
LOA	Letter of Agreement
m	Metres
MOD	Ministry of Defence
NATMAC	National Air Traffic Management Advisory Committee
NavAid(s)	Navigation Aid(s)
NERL	NATS En-route Ltd.
NM	Nautical Mile
OPNOT	Operational Notice
PANS-OPS	Procedures for Air Navigation Services- Aircraft Operations
PBN	Performance Based Navigation
PTH	PERTH DVOR
RAD	Route Availability Document
RNAV	Area Navigation
RNP	Required Navigational Performance
SARG	Safety and Airspace Regulation Group

R/T	Radio Telephony
SID	Standard Instrument Departure
SRD	Standard Route Document
SSR	Secondary Surveillance Radar
STAR	Standard Terminal Arrival Route
VFR	Visual Flight Rules

End of document