

Renaming & Removing Outstanding
Enroute IFP dependencies on
ground-based NAVAIDs

Phase 1 Holds and STARs
Stage 4 Update and Submit

Airspace Change Proposal
Issue 1.0

NATS Public

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Contents

1. Introduction.....	3
2. Executive Summary	4
3. Current Airspace Description	5
4. Statement of Need	7
5. Proposed Airspace Description.....	7
6. Impacts and Consultation.....	9
7. Analysis of Options.....	11
8. Airspace Description Requirements	13
9. Safety Assessment	14
10. Operational Impact.....	14
11. Supporting Infrastructure/ Resources	15
12. Airspace and Infrastructure.....	16
13. Environmental Assessment.....	19
14. Reversion Statement.....	20
15. Appendices.....	21

1. Introduction

The intent of this document is to summarise and satisfy the requirements of CAP1616 Stage 4: update design and submit airspace change proposal to the CAA. The CAA reference is ACP-2020-101, the link to the CAA portal page is [here](#).

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

Following Phase 1 of the NATS DVOR rationalisation program, 12 conventional en-route Instrument Flight Procedures (IFP) remained in the UK Aeronautical Information Publication (AIP). This proposal seeks to replicate these remaining IFPs, removing any residual dependencies on ground-based NavAids.

The scope of the proposal includes Standard Terminal Arrival Routes (STARs) and holding patterns which have remaining dependencies on/ references to ground-based NavAids; where NATS is the primary Air Navigation Services 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. Airport operators, where required are separately developing their own equivalent procedures to mitigate against the removal of ground-based NavAids.

As described in Section 7.2.1 below, there are several methods in which a STAR or a Hold's dependency on a navaid can be removed. As such, each STAR and Hold has been evaluated in order to determine the most appropriate method in which to remove the dependency from / reference to ground-based NavAids. This method improves the overall network connectivity, reduces duplication and accounts for the current usage levels.

2. Executive Summary

Following the DVOR Rationalisation Programme, 12 conventional IFPs remained within the AIP. These 12 procedures are dependent on or reference ground-based NavAids and are not currently named in accordance with ICAO naming convention. In order to remove the remaining IFP dependencies from these NavAids, 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 3](#)), the Design Principles for this ACP were reviewed to ensure that they are still relevant; a consistent set having been used throughout the DVOR Programme.

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 4](#)), the following four separate design options were developed in order to remove the identified en-route IFP dependencies on or references to ground-based NavAids:

Option 0 – Do nothing: Retain all the STARs and Holds 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 and Holds 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 ground-based NavAids.

The five Design Principles were used to qualitatively assess each of the four design options ([Ref 4](#)). 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.

3. Current Airspace Description

The current en-route IFPs which are not named in accordance with ICAO naming convention and/or reference or are dependent on ground-based NavAids are associated with Manchester, Liverpool, Bristol and Cardiff airports. These are summarised in Table 1 below and the relevant charts can be found in the Stage 2 Gateway document [\(Ref 4\)](#).

Associated Airport	Current IFP	Current Routing	Ground-based NavAid Dependency
Manchester	MIRSI 1A	<i>MONTY – REXAM – WAL – MIRSI</i>	WAL DVOR
Manchester	MIRSI 3B	<i>MALUD – WAL – MIRSI</i>	WAL DVOR
Manchester	MIRSI 2C	<i>PENIL – WAL – MIRSI</i>	WAL DVOR
Manchester	MIRSI 2D	<i>GIGTO – IBRAR – WAL – MIRSI</i>	WAL DVOR
Manchester	MIRSI Hold	N/A	WAL DVOR POL DVOR DME
Liverpool	TIPOD 4A	<i>MALUD – TIPOD</i>	Not dependent
Liverpool	TIPOD 2B	<i>PENIL – RUGER – TIPOD</i>	WAL DVOR
Liverpool	TIPOD 1C	<i>CROFT – WAL – BAROS – intercept WAL R297 to TIPOD</i>	WAL DVOR
Liverpool	TIPOD 1D	<i>POL – WAL – BAROS – intercept WAL R297 to TIPOD</i>	WAL DVOR POL DVOR DME
Liverpool	TIPOD 1E	<i>DESIG – WAL – BAROS – intercept WAL R297 to TIPOD</i>	WAL DVOR
Liverpool	TIPOD Hold	N/A	WAL DVOR
Bristol	BRI 1C STAR	<i>CPT - POMAX - BRI</i>	CPT DVOR BRI NDB
Cardiff	CDF 1C STAR	<i>CPT - ABDAL - BRI - CDF</i>	CPT DVOR BRI NDB, CDF NDB

Table 1: Summary of Current Conventional IFPs.

3.1 Structures and Routes

The full technical notes and associated charts for each of the above current conventional IFPs, listed in Table 1, can be found in the Assessment Meeting slide pack [\(Ref 2\)](#).

3.2 Airspace usage and proposed effect

The proportions of aircraft arriving at the relevant airports, including fleet mix and operators, would not change as an outcome of the proposed changes. The proposed flight plan connectivity remains unchanged due to RNAV replication of the STARS and the addition of flight-plannable directs (DCTs) for non-RNAV1 aircraft; therefore, the usage would remain the same as today. There would be no change to pilot or controller behaviour, and no change to lateral or vertical traffic dispersion beyond minor consequential effects, as a result of RNAV replication. There will be no impact on adjacent IFPs or airspace capacity. Therefore, airspace usage and current operation will stay the same as today.

Replicating the STARS serving Manchester and Liverpool airports using RNAV1 will cater for PBN equipage of >91.2% (Q3 2019 figures) of arrivals into these airports, see Table 2:

Airport	STAR	Planned Arrivals on relevant STARs		RNAV5 %	Calculated Number of RNAV5 equipped aircraft on relevant STARs	
		Planned Total	Planned Per STAR ¹		Total	Per STAR
Liverpool	TIPOD 4A	9676	2064	9.8	948	202
	TIPOD 2B		3594			352
	TIPOD 1C		432			42
	TIPOD 1D		61			6
	TIPOD 1E		3525			345
Manchester	MIRSI 1A	30903	14542	2.44	754	355
	MIRSI 3B		11633			284
	MIRSI 2C		437			11
	MIRSI 2D		4291			105

Table 2: Number of aircraft filing a relevant STAR inbound to Manchester and Liverpool airports in 2019 and the calculated number of non-compliant (RNAV5) aircraft. Number of arrivals sourced from Central Flow Management Unit (CFMU) flight planned data from year 2019. All calculated values are rounded to the nearest integer and as such the total number of flights for the calculated columns might not equal the planned flights totals.

Alongside the RNAV replication and re-naming of procedures, this proposal will also extend four STARs, split and extend two STARs creating four new STARs which will allow the incorporation of existing important descent planning levels (DPLs). The routeing of these eight new STARs will be created using RNAV design criteria to align as closely as possible with the existing routeing. Further information can be found in Sections 15.3 and 0 below.

For aircraft not suitably equipped to fly a RNAV1 STAR there will be a provision to flight-plan a route which is coincident with the new RNAV1 procedure. This will be achieved by:

- Following the ATS route while this is coincident with the STAR,
- Once the STAR deviates from the ATS route, aircraft will follow a series of Directs (DCTs) (as detailed in the SRD) coincident with the STAR, terminating at the holding fix.
- ATC will continue to tactically manage these aircraft, providing Heading/ Level/ Speed/ Holding instructions as necessary.
- In the event of a Radio Communications Failure (RCF) aircraft will be expected to follow the procedures detailed in the UK AIP AD2.22.

This provision will be published in the relevant sections of the airfield AIP AD2.22.

The two remaining STARs serving Bristol airport (BRI 1C) and Cardiff airport (CDF 1C) will be replicated to the RNAV5 specification. This specification has been chosen to be consistent with the specification of the STARs previously replicated for these airports during the BCN DVOR ACP (ACP-2019-69).

The TIPOD hold serving Liverpool airport will be RNAV1 replicated. Non-RNAV1 equipped aircraft (~3 per day in 2019 flying a relevant STAR), will, where required be tactically held and monitored by ATC. Radar data indicates that only two aircraft in total (RNAV1 equipped and non-equipped) flying a relevant STAR entered the hold at TIPOD in August 2019. This can therefore be considered to have a negligible impact on capacity.

The MIRSI hold serving Manchester airport will be RNAV1 replicated. Non-RNAV1 equipped aircraft (~2 per day in 2019 flying a relevant STAR), will, where required be tactically held and monitored by ATC. August 2019, radar data indicated that only 37 aircraft in total (RNAV1 equipped and non-equipped) flying a relevant STAR

¹ Some STARs are over estimated as aircraft have filed to join partway along a STAR at a common point. E.g. an aircraft joining a TIPOD STAR at WAL could join any of the coincident the TIPOD 1C, 1D or 1E STARs, however most will join the TIPOD 1C

entered the hold at MIRSI. This equates to ~1 non-equipped aircraft holding throughout August and can be considered to have a negligible impact on capacity.

These 14 procedures will be re-named based on their starting waypoints and will conform as closely as possible to the current conventional procedures.

None of the proposed design changes will introduce any change to pilot or controller behaviour; no change to lateral or vertical traffic dispersion; nor any impact on adjacent IFPs. Therefore, the airspace capacity, usage and current operation will stay the same as today.

3.3 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.

3.4 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 9 contains further details on the safety assessment for this proposal.

3.5 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.

4. Statement of Need

A Statement of Need was submitted in December 2020 for this proposal which summarised the proposed changes in support of removing the en-route dependencies from Ground-based NavAids. Following the Assessment meeting on the 21st April 2021 a revised SoN was submitted, V3 ([Ref 1](#)). This has been included in Section 15.2.

5. Proposed Airspace Description

5.1 Objectives/ requirements for Proposed Design

The primary objective for this proposed airspace design is to redesignate all remaining en-route IFPs in line with ICAO conventions. Furthermore, this ACP seeks to remove all remaining references to or dependencies from ground-based NavAids from these remaining 12 IFPs. This will be achieved by replicating the current connectivity using RNAV procedures. The en-route flight procedures under consideration in this ACP are the MIRSI and TIPOD holds and the following 11 STARS:

- MIRSI 1A, 3B, 2C and 2D;
- TIPOD 4A, 2B, 1C, 1D and 1E;
- BRI 1C;
- CDF 1C

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

The CAA's PBN STAR Replication Policy for Conventional STAR Replacement ([Ref 8](#)) has been used as a basis for this proposal. It defines PBN STAR Replication as *PBN compliant procedures that are intended to replace existing conventional STARS start from the commencement of the STAR in the ATS en-route network to the termination point (normally in the terminal environment) with the intention of retaining the existing route and track over the ground, shall be referred to as a replicated PBN STAR.*

This proposal has been used as an opportunity to review the relevance of the existing procedures and their details. As such, methods including extending back RNAV versions of existing STARs - to ensure that important Descent Planning Levels are incorporated - have been explored and considered. In some cases, this will require the establishment of slightly amended STARs to ensure that all flight options and levels are captured; but will not change the lateral track or vertical profile of traffic flown today. This is in line with the STAR replication policy mentioned above.

5.2 Proposed New Airspace/ Route Definition and Usage

There is no predicted change to current connectivity or flight behaviour as a consequence of this airspace change proposal beyond minor consequential effects, as a result of RNAV replication; the proposed changes are only technical changes. This means that there would be no change to pilot or controller behaviour (apart from designation changes), nor any 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 changes and associated impacts can be found in Sections 15.3 to 15.6 below. This details the impact assessment which was completed for all IFPs to be replicated. These procedures are summarised below:

- **Manchester Airport:** MIRSI 1A/ 3B/ 2C/ 2D/ and MIRSI Hold
- **Liverpool Airport:** TIPOD 4A/ 2B/ 2C/ 2D and TIPOD Hold
- **Bristol Airport:** BRI 1C
- **Cardiff Airport:** CDF 1C

Charts and technical notes on all of the above individual IFPs can be found in the Assessment Meeting slide pack ([Ref 2](#)). The proposed changes to RNAV replicate the STARs will not change the connectivity of the procedures from today with or without appropriate extensions. Where extended STARs are being proposed, appropriate starting points for the STAR have been identified to ensure that there is no impact to connectivity. This means that:

- Routes are unchanged;
- Connectivity is unchanged;
- Hence flight behaviours and traffic patterns over the ground are unchanged.

As part of this change all remaining NavAid dependencies will be removed from the ENR section of the UK AIP.

The proposed procedure changes will not alter the traffic patterns or route usage, due to the replication of Holds and STARs. Full 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 6](#)), alongside the NATS Design IFP report ([Ref 7](#)).

6. Impacts and Consultation

6.1 Net impacts summary for proposed route

Category	Impact	Evidence
Safety/ Complexity	No impact on safety or complexity	See Section 3.4 and Section 9
Capacity/Delay	No impact on capacity/ usage or delay	See Section 3.2
Fuel Efficiency/ CO ₂	No impact, there will be no change to lateral or vertical tracks, nor to impact adjacent IFPs	See Section 6.7
Noise – Leq/ SEL	No impact, this is a Level 2C ² change	See Section 6.8
Tranquillity, visual intrusion (AONBs & National Parks)	No impact, this is a Level 2C change	See Section 6.8
Local Air Quality	No impact, this is a Level 2C change	See Section 6.8
Other Airspace Users	No impact, no changes to volume or classification of CAS	See Sections 6.4 to 6.6

6.2 Units affected by the proposal

In order to provide full transparency, NATS has engaged with the London and Scottish Area Control Centres (assumed associates throughout the DVOR programme), Liverpool Airport, Manchester Airport, Bristol Airport, Cardiff Airport as well as the Irish Aviation Authority (IAA) throughout the project ([Ref 9](#)). The airports have been fully engaged with on the proposed changes and briefed on the justification behind why the en-route DVOR dependencies are being removed. As covered in the engagement evidence ([Ref 9](#)), the airports also provided NATS with additional information on the current procedures such as typical holding levels. The airports and the IAA have all confirmed support for the proposed changes. The changes have all been designed to be invisible from an airport’s perspective, aside from the required updates to the AIP.

The proposed changes will alter nomenclature in the aerodrome AIP pages for the airports; where STAR names are being re-named. Appropriate airport representatives have been informed about these changes prior to submission of this ACP. There were no issues raised as part of the engagement nor any changes made to the proposed designs. Assuming approval of this ACP, the affected airports will then be advised, and permission sought to amend these sections of the AIP.

Asides from these changes, there are no other impacts anticipated for airports or relevant activities; the scope of these changes is just for en-route procedures, not airports. Airports will complete their own Airspace Change Proposals to remove navaid dependencies for airport procedures, such as SIDs and instrument approaches. The changes are purely technical changes which will not lead to any material change to the current operation. If the proposal is approved, NATS will also organise appropriate co-ordination with ICAO prior to implementation.

6.3 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.

² 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 only impacts the enroute procedures. It therefore 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.

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 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.

6.4 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.

6.5 General Aviation (GA) airspace users' impact and consultation

No GA stakeholders have been identified as being impacted by the proposed changes. This proposal does not affect flights below FL70.

6.6 Commercial air transport impact and consultation

There would only be technical changes for commercial air transport such as nomenclature and RNAV route replication. Where RNAV1 is the proposed navigation standard, provision for non RNAV1 aircraft will be provided through a series of DCTs. There would be no impact to connectivity or flight behaviour beyond minor consequential effects as a result of RNAV replication, 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.

6.7 CO₂ environmental analysis impact and consultation

There would be no change in fuel, CO₂ 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 (DP2) 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.

6.8 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 overflying Welsh Quiet Areas, Areas of Outstanding Natural Beauty (AONBs) or National Parks, as a result of the proposed changes because there will be no change to lateral or vertical tracks, nor any impact to adjacent IFPs.

This aligns with the Design Principle (DP2) which is driving this change, of ensuring that none of the proposed technical changes to IFP definitions result in any change to actual flight behaviours.

6.9 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 VOR. However, the development of this ACP has not been motivated by economic constraints or opportunities.

7. Analysis of Options

7.1 Airspace Change Design Options

In order to replicate the remaining conventional IFPs to remove any residual dependencies on ground-based NavAids, 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 4](#)).

The first considered option (Option 0), of doing nothing, would retain all the current STARs and Holds 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/Holds, exactly as defined in the AIP without considering any practicalities.
- **Option 2:** Examine the use of existing STARs and Holds 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 ground-based NavAids.

7.2 Design Options Assessment

7.2.1 Design Principles

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 3](#)), 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: to remove the remaining en-route references to and/or dependencies on ground-based NavAids; maintaining or enhancing safety levels; and introducing no change to actual flight behaviour. For example, this ACP will remove the en-route dependency of several Liverpool and Manchester procedures from the WAL 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 remaining en-route dependencies on ground-based NavAids, this proposal also includes a number of STAR extensions which ensure that current important descent planning levels are maintained, whilst 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 (DPO) - 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
<i>DP1 Safety</i>	The proposed airspace change must maintain or enhance the current level of safety
<i>DP2 No change to flight behaviour</i>	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
<i>DP3 PBN Specification</i>	The proposed airspace change will yield maximum safety and efficiency benefits by using an appropriate standard of PBN
<i>DP4 Remove DVOR Dependencies</i>	Remove en-route dependencies on ground-based NavAids through appropriate design changes; including removing unnecessary references to ground-based NavAids which are not material to the procedure and rationalising rarely used STARs.
<i>DP5 Airspace Optimisation</i>	Where appropriate, the proposed airspace will facilitate an optimised airspace design. Including: <ul style="list-style-type: none"> • 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.

The five Design Principles summarised above have been detailed fully in the Stage 1B Gateway document ([Ref 3](#)), which includes a contextual example of each Design Principle being put into practice.

7.2.2 Options Assessment using the Design Principles

The four Design Options outlined in Section 7.1 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 4](#)).

The first Option 0: doing nothing, did not meet any of the other Design Principles except for DP1 and DP2: maintain/ enhance the current level of safety and introduce no changes to flight behaviours. Option 0 therefore does not achieve the removal of dependencies from the remaining ground-based NavAids nor improve the network in any way; and has been rejected.

Option 1: Using the CAA policies, replicate STARs/ Holds using RNAV, exactly as defined in the AIP without considering any practicalities - fully met four of the five Design Principles: maintain/ enhance the current level of safety; introduce no changes to flight behaviours; replicate procedures using an appropriate PBN specification; and removing the en-route dependencies on ground-based NavAids. However, Option 1 did not evaluate procedures for potential further airspace optimisation opportunities (DP5) and has therefore also been rejected.

Option 2: Examine the use of existing STARs and Holds 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- involved an individual evaluation of each STAR and Hold. As this option is focussed on a flexible approach for removing the remaining DVOR dependencies, it was able to fully meet all the proposed Design Principles.

Option 3: Remove all existing STARs and holds that refer to or use the ground-based NavAids- would remove all dependencies on ground-based NavAids, thus meeting DP4. However, 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 ground-based NavAid dependencies whilst also maintaining current safety levels, introducing no change to flight behaviour beyond minor consequential effects as a result of RNAV replication, proposes an appropriate PBN specification and improves the overall network design.

8. Airspace Description Requirements

	The proposal should provide a full description of the proposed change including the following:	Description for this proposal
a	The type of route or structure; for example, airway, UAR, Conditional Route, Advisory Route, CTR, SIDs/ STARs, holding patterns etc.	STARs and holding patterns - see Section 5.
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 Section 5.2 and Sections 15.3 to 15.6.
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 would have no impact on airspace usage - see Sections 3.2 and 5.2.
f	Analysis of the impact of the traffic mix on complexity and workload of operations	This proposal would have no impact on the traffic mix - see Sections 3.2 and 5.2.
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; cross-border elements are not impacted.
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 7).
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 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.

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

9.3 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.

9.4 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.

9.5 There would be a qualitative improvement in safety because each remaining IFP would use improved navigation specifications and be defined in an official manner. Today's conventional IFPs are known to be flown using Flight Management System (FMS) overlays, which are not state regulated in the same way.

9.6 Where STARs have been extended and/or additional STARs established as part of this proposal to ensure important Descent Planning levels are maintained as per today, we have ensured that appropriate and safe connectivity is still provided, by identifying common route segments which can be used, which replicates procedures flown today. These will also be assessed as part of the safety hazard analysis, mentioned above in 9.3.

9.7 Therefore, there would be a positive impact on safety whilst also improving the overall network connectivity. This is dependent on the satisfactory completion of the hazard analysis.

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	No impact to air traffic (technical change only) – see Sections 6.5 - 6.6.
b	Impact on VFR operations (including VFR routes where applicable);	No impact on VFR operations. See Section 6.5 - 6.6.
c	Consequential effects on procedures and capacity, i.e. on SIDs, STARs, and/or holding patterns. Details of existing or planned routes and holds	No impact on procedures or capacity (technical change only) - see Section 5.2.
d	Impact on aerodromes and other specific activities within or adjacent to the proposed airspace	No impact on aerodromes or other relevant activities – see Section 6.2.
e	Any flight planning restrictions and/or route requirements	Impact to non-RNAV1 traffic, see Section 3.2

11. Supporting Infrastructure/ Resources

	General requirements	Evidence of compliance/ proposed mitigation
a	Evidence to support RNAV and conventional navigation as appropriate with details of planned availability and contingency procedures	N/A – current RNAV 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 as today in a similar manner from a surveillance point of view. Demonstrably adequate for the region.
c	Evidence of communications infrastructure including R/T coverage, with availability and contingency procedures	Traffic uses the same regions as today in a similar manner from a communications infrastructure 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	Existing contingency procedures based on the ground-based NavAids would no longer be required and will be withdrawn. RNAV replication removes the en-route dependencies from ground-based NavAids. Other existing 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	As above (11d).
f	A clear statement on SSR code assignment requirements	No change to SSR code allocation.
g	Evidence of sufficient numbers of suitably qualified staff required to provide air traffic services following the implementation of a change	No training or additional qualifications required.

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	As today - no proposed changes to the airspace structure (technical changes only). See Section 5.2.
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 existing 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 the 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 classifications.
f	There must be assurance, as far as practicable, against unauthorised incursions. This is usually done through the classification and promulgation	As today– no proposed changes to airspace classification or volume.
g	Pilots shall be notified of any failure of navigational facilities and of any suitable alternative facilities available and the method of identifying failure and notification should be specified	Existing contingency procedures would continue to apply.
h	The notification of the implementation of new airspace structures or withdrawal of redundant airspace structures shall be adequate to allow interested parties sufficient time to comply with user requirements. This is normally done through the AIRAC cycle	No proposed new structures and 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 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.
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	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	RNAV NavAid coverage is demonstrably adequate. DME coverage is adequate and demonstrated in the coverage plots in Reference 6.
b	Where ATS routes adjoin terminal airspace there shall be suitable link routes as necessary for the ATM task	As today – there are no new link routes required as part of this proposal.
c	All new routes should be designed to accommodate P-RNAV navigational requirements	Confirmed – RNAV1/5 specification will be used.

	Terminal airspace requirements	Evidence of compliance/ proposed mitigation
a	The airspace structure shall be of sufficient dimensions to contain appropriate procedures, holding patterns and their associated protected areas	As today - no proposed changes to the airspace structure.
b	There shall be effective integration of departure and arrival routes associated with the airspace structure and linking to designated runways and published instrument approach procedures (IAPs)	As today - no proposed changes to the airspace structure.
c	Where possible, there shall be suitable linking routes between the proposed terminal airspace and existing en-route airspace structure	As today - the revised STARs will end in the same locations as they do currently.
d	The airspace structure shall be designed to ensure that adequate and appropriate terrain clearance can be readily applied within and adjacent to the proposed airspace	As today - no change to the airspace structure.
e	Suitable arrangements for the control of all classes of aircraft (including transits) operating within or adjacent to the airspace in question, in all meteorological conditions and under all flight rules, shall be in place or will be put into effect by the change sponsor upon implementation of the change in question (if these do not already exist)	As today - no change to the airspace structure.
f	The change sponsor shall ensure that sufficient visual reference points are established within or adjacent to the subject airspace to facilitate the effective integration of VFR arrivals, departures and transits of the airspace with IFR traffic	As today - no change to visual reference points.
g	There shall be suitable availability of radar control facilities	As today - no change to radar control facilities.
h	The change sponsor shall, upon implementation of any airspace change, devise the means of gathering (if these do not already exist) and of maintaining statistics on the number of aircraft transiting the airspace in question. Similarly, the change sponsor shall maintain records on the numbers of aircraft refused permission to transit the airspace in question, and the reasons why. The change sponsor should note that such records would enable ATS managers to plan staffing requirements necessary to effectively manage the airspace under their control	As today - there are no proposed changes to the airspace structure.
i	All new procedures should, wherever possible, incorporate Continuous Descent Approach (CDA) profiles after aircraft leave the holding facility associated with that procedure	As today – no new procedures.
	Off-route airspace requirements	Evidence of compliance/ proposed mitigation
	There are no proposed changes to off-route airspace structures	

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)	N/A – no change in CO ₂ , fuel or noise impacts. See Section 6.7.
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 CO ₂ emissions impacts, the rationale must be explained	N/A – no change in CO ₂ or fuel impacts. See Section 6.7.
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	See the Assessment Meeting slide pack (Ref 2). No change to environmental impacts, as covered in Section 6.7 and 6.8.
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 3.2.
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 Section 6.7 and 6.8.

14. Reversion Statement

Should the proposal be approved and implemented, reversion to the pre-implementation state would only be possible if the conventional NavAids are kept in operation. Once the navaids are removed it would not be possible to revert to the pre-implementation state.

The procedures included within this submission are dependent on or make reference to a ground-based NavAids. As such, 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.

15. Appendices

15.1 References

Ref No	Name	Hyperlink
1	DVOR Phase 1 STARs Statement of Need V3	Link
2	DVOR Phase 1 STARs Stage 1 Assessment Meeting Slides V1.0	Link
3	DVOR Phase 1 STARs Stage 1B Document V1.1	Link
4	DVOR Phase 1 STARs Stage 2 Document V1.1	Link
5	DVOR Phase 1 STARs Stage 3 Document V1.0	Link
6	AIP changes in support of DVOR Phase 1 STARs Airspace Change Proposal V1.0	Supplied directly to CAA
7	NATS Design Ltd. DVOR Phase 1 STARs Design Report (IFP Report) V3.0	Supplied directly to CAA
8	SARG Policy: Policy for the replication of conventional SIDs, STARs and Holds using PBN	Link
9	DVOR Phase 1 STARs – Engagement Evidence (redacted)	Link

15.2 Statement of Need (V3) for Phase 1 STARs ACP (ACP-2020-101)

Cause

Some legacy conventional STARs are out of step following the change of policy on STAR naming convention, and are reliant on ground based navigation aids.

(Policy is that STARs are now named in accordance with ICAO naming convention which uses the start point as part of the designator).

Current Situation

The DVOR Rationalisation Project has converted most STARs in the UK FIR to RNAV, and in so doing has removed their dependency on ground-based navigation aids.

There remain 11 Conventional STARs. Currently these use the legacy naming convention and hence are designated incorrectly.

Issue to be addressed

The remaining conventional STARs need to be renamed in line with ICAO convention. NATS also propose to replicate these STARs with RNAV PBN equivalent procedures and withdraw the conventional procedures. This will remove the dependency of all en-route procedures from the UK ground based navigation network

15.3 Impact assessment: Manchester 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
MIRSI 1A STAR	<i>N864: MONTY – REXAM – WAL – MIRSI</i>	Satisfies all 5 DPs	RNAV1 replication	<i>N864: OKTEM – MONTY – REXAM – WAL – MIRSI</i> Re-named as OKTEM 1M	<p>The conventional STAR will be RNAV1 replicated and extended back to existing waypoint OKTEM (along N864).</p> <p>Extending the STAR back to OKTEM will provide flight plannable options and retain the important descent planning restriction, FL200 by OKTEM.</p> <p>New descent planning level, FL70 at MIRSI included.</p> <p>STAR to be re-named based on its new starting waypoint <i>OKTEM</i> and the 'M' designator used to denote the destination airport (Manchester).</p> <p>RNAV5 Aircraft will follow an ATS route or series of DCT's which replicate the route of the RNAV1 STAR and the MIRSI hold will be designated RNAV1.</p>
MIRSI 3B STAR	<i>L975/Q37: MALUD – WAL – MIRSI</i>	Satisfies all 5 DPs	RNAV1 replication	<i>L975/Q37: MALUD – WAL – MIRSI</i> Re-named as MALUD 1M	<p>The conventional STAR will be RNAV1 replicated</p> <p>It is not possible to extend the STAR backwards to incorporate the descent planning level restriction at LIFFY and BOFUM owing to the associated timings. These will continue to be captured in the UK RAD.</p> <p>New descent planning level, FL70 at MIRSI included.</p>

Current IFP	Current route connectivity/ STAR	Design Principle	How	Proposed route Connectivity/ STAR	Impact of proposed change on connectivity and flight behaviour
					<p>STAR to be re-named based on its new starting waypoint <i>MALUD</i> and the 'M' designator used to denote the destination airport (Manchester).</p> <p>RNAV5 Aircraft will follow an ATS route or series of DCT's which replicate the route of the RNAV1 STAR and the MIRSI hold will be designated RNAV1.</p>
MIRSI 2C STAR	<i>L10,L28: PENIL – WAL – MIRSI</i>	Satisfies all 5 DPs	RNAV1 replication	<i>L10,L28: PENIL – WAL – MIRSI</i> Re-named as PENIL 1M	<p>The conventional STAR will be RNAV1 replicated.</p> <p>New descent planning level, FL70 at MIRSI included.</p> <p>STAR to be re-named based on its new starting waypoint <i>PENIL</i> and the 'M' designator used to denote the destination airport (Manchester).</p> <p>RNAV5 Aircraft will follow an ATS route or series of DCT's which replicate the route of the RNAV1 STAR and the MIRSI hold will be designated RNAV1.</p>
MIRSI 2D STAR	<i>L15/Q38: GIGTO – IBRAR – WAL – MIRSI</i>	Satisfies all 5 DPs	RNAV1 replication	<i>L15/Q38: MAKUX – SOSIM – GIGTO – IBRAR – WAL – MIRSI</i> Re-named as MAKUX 1M	<p>The conventional STAR will be RNAV1 replicated and extended back to existing waypoint MAKUX (along L15/Q38).</p> <p>Extending the STAR back to MAKUX will provide flight plannable options and retain the important descent planning restriction.</p> <p>New descent planning levels, FL270 at MAKUX and FL70 at MIRSI included.</p>

Current IFP	Current route connectivity/ STAR	Design Principle	How	Proposed route Connectivity/ STAR	Impact of proposed change on connectivity and flight behaviour
					<p>STAR to be re-named based on its new starting waypoint <i>MAKUX</i> and the 'M' designator used to denote the destination airport (Manchester).</p> <p>RNAV5 Aircraft will follow an ATS route or series of DCT's which replicate the route of the RNAV1 STAR and the MIRSI hold will be designated RNAV1.</p>
MIRSI hold	N/A	Satisfies DP1, DP2, DP3, & DP4 - no further changes proposed (DP5)	RNAV1 replication	N/A	<p>This Hold will be RNAV1 replicated, to match as closely as possible with the currently published conventional Hold.</p> <p>The RNAV Hold MIRSI will have a "MAX 230IAS" speed limit.</p> <p>The minimum level will be updated to FL60 from 6000 ft owing to the transition altitude being 5000 ft.</p> <p>RNAV5 aircraft when required will be issued holding instructions via ATC.</p>

15.4 Impact assessment: Liverpool 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
TIPOD 4A STAR	<i>(U)L975/Q37: MALUD – TIPOD</i>	Satisfies all 5 DPs	RNAV1 replication	<i>Q37: BOFUM – BAKUX – BAVUD – DONAX – MALUD – TIPOD</i> Re-named as BOFUM 1L	<p>The conventional STAR will be RNAV1 replicated and extended back to BOFUM (along Q37).</p> <p>Extending the STAR back to BOFUM will provide flight plannable options and retain the important descent planning restrictions.</p> <p>New descent planning level, FL270 at BOFUM and FL70 at TIPOD included.</p> <p>SLP at WAL D18 has been removed as the retained 210KIAS at TIPOD will produce the desired speed reduction.</p> <p>STAR will be re-named based on its new starting waypoint <i>BOFUM</i> and the 'L' designator used to denote the destination airport (Liverpool).</p> <p>RNAV5 Aircraft arriving through LIFFY via (U)L975 will follow the ATS route to MALUD before following by a series of DCT's which will remain coincident with the RNAV1 STAR</p>
TIPOD 2B STAR	<i>L10,L28. Q38: PENIL – RUGER – TIPOD</i>	Satisfies all 5 DPs	RNAV1	<i>L10, L28. Q38: PENIL – RUGER – TIPOD</i> Re-named as PENIL 1L	<p>The conventional STAR will be RNAV1 replicated</p> <p>New descent planning level, FL70 at TIPOD included.</p> <p>SLP at WAL D18 has been removed as the retained 210KIAS at TIPOD will produce the desired speed reduction.</p>

Current IFP	Current route connectivity/ STAR	Design Principle	How	Proposed route Connectivity/ STAR	Impact of proposed change on connectivity and flight behaviour
TIPOD 1D STAR	<i>N57/POL, P18 (FL175 and below): POL – WAL – BAROS – intercept WAL R297 to TIPOD</i>	Satisfies all 5 DPs	RNAV1	<i>N57/POL, P18: POL: – WAL – BAROS –TIPOD</i> Re-named as POL 1L	<p>The conventional STAR will be RNAV1 replicated.</p> <p>New descent planning level FL70 at TIPOD included.</p> <p>SLP at WAL D6 has been removed as the retained 210KIAS at TIPOD will produce the desired speed reduction.</p> <p>210 KIAS speed limit introduced at BAROS to aid the entry into the hold.</p> <p>STAR to be re-named based on its new starting waypoint <i>POL</i> and the 'L' designator used to denote the destination airport (Liverpool).</p> <p>RNAV5 Aircraft will follow an ATS route or series of DCT's which replicate the route of the RNAV1 STAR.</p>
TIPOD 1E STAR	<i>(U)L975: DESIG – WAL – BAROS – intercept WAL R297 to TIPOD</i>	Satisfies all 5 DPs	RNAV1	<i>Y70: VEGUS – SIVBU – GIPLO – GOLES – UPTON – UNIGO – DESIG – WAL – BAROS –TIPOD</i> Re-named as VEGUS 1L	<p>The conventional STAR will be RNAV1 replicated and extended back to VEGUS (along L975/ Y70) and LIBSO (along (U)L975).</p> <p>Extending the STAR back to VEGUS and LIBSO will provide flight plannable options and retain the important descent planning restrictions.</p>

Current IFP	Current route connectivity/ STAR	Design Principle	How	Proposed route Connectivity/ STAR	Impact of proposed change on connectivity and flight behaviour
			RNAV1	<p><i>(U)L975: LIBSO –FIZED³ – GOLES – UPTON – UNIGO – DESIG – WAL – BAROS – TIPOD</i></p> <p>Re-named as LIBSO 1L</p>	<p>SLP at WAL D6 has been removed as the retained 210KIAS at TIPOD will produce the desired speed reduction.</p> <p>210 KIAS speed limit introduced at BAROS to aid the entry into the hold.</p> <p>New descent planning levels, FL290 at LIBSO (LIBSO1L), FL290 at VEGUS (VEGUS 1L), FL170 at UPTON and FL70 at TIPOD included.</p> <p>FIZED is included as a new point for ATC to use as a “level by” point depending on activity status of TRA006.</p> <p>STAR will be re-named based on its new starting waypoints <i>VEGUS and LIBSO</i> and the ‘L’ designator used to denote the destination airport (Liverpool).</p> <p>RNAV5 Aircraft will follow an ATS route or series of DCT’s which replicate the route of the RNAV1 STAR.</p>
TIPOD hold	N/A	Satisfies DP1, DP2, DP3, & DP4 - no further changes proposed (DP5)	RNAV1 replication	N/A	<p>This Hold will be RNAV1 replicated, to match as closely as possible with the currently published conventional Hold.</p> <p>Hold will be published FL70 – FL100.</p> <p>RNAV5 aircraft when required will be issued holding instructions via ATC.</p>

³ FIZED is being introduced as part of MCT DVOR ACP (ACP-2020-018) and is assumed as an existing point for this documentation. If the MCT ACP is not approved, this ACP will include the introduction of FIZED as a new point.

Current IFP	Current route connectivity/ STAR	Design Principle	How	Proposed route Connectivity/ STAR	Impact of proposed change on connectivity and flight behaviour
					The RNAV Hold TIPOD will have a "MAX 210IAS" speed limit.

15.5 Impact assessment: Bristol 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
BRI 1C	<i>L9: CPT – POMAX – NDB(L) BRI</i>	Satisfies all 5 DPs	RNAV5 replication	<i>L9: CPT – POMAX – BRI</i> Re-named as CPT 1B	<p>The conventional STAR will be RNAV5 replicated to align with other STARs replicated in the BCN DVOR ACP.</p> <p>MAX 220 KIAS included at BRI.</p> <p>New descent planning level, FL70 at BRI included.</p> <p>STAR to be re-named based on its new starting waypoint <i>CPT</i> and the 'B' designator used to denote the destination airport (Bristol).</p>

15.6 Impact assessment: Cardiff 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
CDF 1C	<i>L9: CPT – ABDAL – BRI – NDB(L) CDF</i>	Satisfies all 5 DPs	RNAV5 replication	<i>L9: CPT – ABDAL – BRI – CDF</i> Re-named as CPT 1C	<p>The conventional STAR will be RNAV5 replicated to align with other STARs replicated in the BCN DVOR ACP.</p> <p>MAX 220 KIAS included at CDF.</p> <p>New descent planning level, FL70 at CDF included.</p> <p>STAR to be re-named based on its new starting waypoint <i>CPT</i> and the 'C' designator used to denote the destination airport (Cardiff).</p>

15.7 Engagement Activity

This section summarises the engagement activities we conducted, which influenced the design decisions/ considerations. Copies of the engagement material have been provided as supporting evidence ([Ref 9](#)).

Stakeholder	Type of engagement	Date	Notes
Manchester Airport	Telephone Email	August 2021	Telephone Call to describe and discuss proposed changes Email follow up to confirm approval of changes
Liverpool Airport	Telephone Email	August 2021	Telephone Call to describe and discuss proposed changes Email follow up to confirm approval of changes
Bristol Airport	Telephone Email	August 2021	Telephone Call to describe and discuss proposed changes Email follow up to confirm approval of changes
Cardiff Airport	Telephone Email	August 2021	Telephone Call to describe and discuss proposed changes Email follow up to confirm approval of changes
IAA	Email	August 2021	Email to confirm no impact of STAR commencing at London/ Irish FIR interface
DAATM	Email	October 2021	Email to confirm no impact of point FIZED on SUA Activity

End of document