DVOR DTY Holds and STARs Documentation: CAP1616 Stage 2 Gateway

V2.0

NATS Uncontrolled

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1.0	January 2020	Submitted to CAA
2.0	January 2020	Section 2.2 Clarification added re RNAV5 specification. Section 2.2 & 3.5 BOMBO Hold removed from this document Section 2.8 Clarification added for option description Section 8 VELAK corrected to VELAG

Contents

1. Introduction

This document continues the CAP1616 process started with the Statement of Need (DAP1916) submitted in July 2019. The intent of this document is to summarise and satisfy the requirements of CAP1616 Stage 2. The CAA reference is ACP-2019-56, the link to the CAA progress page is here.

This proposal is limited to removing the dependency of enroute instrument flight procedures in the UK AIP from the Daventry (DTY) DVOR. Hence this proposal is focused on Standard Terminal Arrival Routes (STARs), and their associated holds which refer to DTY as a conventional navaid in the enroute environment where NATS is the primary air navigation services provider (ANSP).

This proposal contains the relevant changes to remove the dependency on DTY from these STARs and holds. Design Principles have been developed (Stage 1B) which are focused on best removing the enroute DVOR dependencies whilst ensuring the changes are safe and do not result in changes to flight behaviour. This document will identify:

- option concepts for replacing current connectivity relevant to DTY with RNAV procedures;
- an evaluation of those option concepts against the Design Principles;
- a full list of the specific changes.

2. Stage 2 Develop and Assess

Step 2A Options Development

2.1 CAA's PBN STAR Replication Policy (V2) was published in Mar 2018 and was used as the basis for this proposal. It defines PBN STAR Replication as a PBN redesign of an existing conventional STAR from the commencement of the STAR in the ATS enroute network to the termination point with the intention of retaining the existing route and track over the ground (para 5.4). Para 5.5 of the same policy makes assumptions that replication ensures procedures follow the same path over the ground as the existing conventional procedure, as closely as possible. This means that there would be no change to pilot or controller behaviour (apart from technical designation changes), and no change to lateral or vertical traffic dispersion.

2.2 Airspace change design options:
The design options considered to remove the enroute dependencies from DTY, were limited to the following:

Option 0 – Do nothing. Retain all the STARs and holds unchanged from today's AIP definition.
Option 1 – Using the CAA policies, replicate STARs/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 the DTY DVOR.

Engagement with relevant airfields and Procedure teams at the London Area Control Centre at Swanwick determined that we would replicate conventional STARs and Holds as closely as possible using PBN design criteria, using the RNAV 5 specification (See Annex H for details of engagement activity). As these procedures are replications of current conventional procedures and there is no requirement for ensuring separation from other ATS Routes/STARs, RNAV5 is the preferred specification in order to ensure greatest accessibility to routes, rather than limiting to those aircraft with RNAV1 equipage.

To reduce the number of STARs required to be maintained, some underutilised STARs will be removed, whilst some new STARs will be established. Key Descent Planning levels will be incorporated on the RNAV versions of extant conventional STARs if required.

For Birmingham, the underutilised CHASE 3A STAR for traffic FL70 and below will be removed, it has not been utilised by any traffic in 2018/2019. OLIVE 3A STAR will be removed as it is a contingency STAR for when HON is out of service, so no longer required. The extant CHASE 2D STAR has several Descent Planning Levels

stipulated; if this STAR was just replicated and designated as AMPIT 1B these would be 'lost'. We propose to extend this STAR back to MALUD, replacing CHASE 2D with MALUD 1B to capture traffic via (U)L975, and three new STARS are created to capture the traffic mix via L15 (MAKUX 1B), (U)Y124 (DOLOP 1B) and Q36 (NOSLO 1B). Birmingham Airport has been engaged to these proposals and has no objection.

For East Midlands, initial designs proposed that the PIGOT Hold might better fit RNAV design criteria with the holding fix at UPDUK and this was originally proposed. Engagement with East Midlands Airport identified this would create significant issues for the EMA EFPS, based on PIGOT, as well as the 'without radar control' procedures which would require amending slightly. Following this feedback, various options were explored, and it is now proposed to RNAV replicate with PIGOT remaining as the Holding fix.

PIGOT 1H STAR will have a new waypoint (MIHAK) added at the Speed Limiting Point and PIGOT 1J STAR will be extended back to HEMEL (HEMEL 1E) to allow for the Standing Agreement of FL220 HEMEL on this STAR to be incorporated.

East Midlands Airport have been engaged with all these proposals and have influenced these designs, with no objections to current proposals.

Luton and Stansted have been engaged with regard to the truncation of LOREL 1K STAR due to M605 replacing the DTY-FINMA section.

The DTY Hold is an underutilised en-route procedure which will be removed; it is a legacy hold which is no longer used due to its location.

2.3 Stakeholder Engagement

As part of Stage 2, CAP1616 requires change sponsors to develop a comprehensive list of Design Options, which are tested with the same group of stakeholders who were engaged with during Stage 1. However, as covered in the Stage 1B Design Principles document (Ref 5), the DPs for this submission were engaged upon with NATMAC in 2008; prior to the introduction of CAP1616 and the requirement to seek feedback on DPs.

Alongside the DPs, the Design Options have been developed to provide different methods in which the en-route dependencies can be removed from a DVOR, whilst ensuring no changes to flight behaviours. The Design Options have been used consistently across the numerous DVOR submissions as they achieve the same outcome; although they are always reviewed to ensure relevance. We therefore conclude that there is no need to re-consult with the NATMAC members, nor any additional stakeholders, as there will not be any impact upon them.

However, as part of this Airspace Change Proposal and as per previous submissions, NATS has been in contact with relevant airfields which use the STARs and associated Holds we plan to RNAV, specifically Birmingham, East Midlands, Luton and Stansted. The aerodrome sections of the AIP for the affected airfields will need to be updated which this engagement has allowed us to inform them of. The proposed changes have been designed to be invisible from an airport's perspective so there are no other impacts anticipated. Annex H provides a summary of the engagement activity for these procedures. Unredacted engagement evidence is supplied to the CAA separately.

Previous DVOR removal proposals have all contained three Design Options: in summary, to do nothing; to replicate all procedures; and lastly, to examine all procedures and improve where appropriate (rationalise/ truncate/ replicate). These Design Options were accepted by the CAA. NATS was later requested to add an additional option to all future submissions, whereby all procedures with a dependency are removed; thus, removing the DVOR dependency. The CAA acknowledged that this Design Option would never meet the Design Principles however; it should be included for completeness.

The Design Options have therefore been developed so they can be applied to each of the individual DVOR submissions and have evolved following guidance from the CAA. As mentioned above, appropriate engagement has previously been completed with NATMAC members; and airports will be fully briefed when their AIP pages require updating.

Step 2A Options Development: Design Principle Evaluation

This section evaluates the performance of all 4 Design Options with respect to each Design Principle. The Design Principles developed during Stage 1 are included at Appendix A for reference.

2.3 Option 0 – Do nothing

Retain all the STARs and holds unchanged from today's AIP definition.

2.4 See the submitted Stage 1 Assessment Meeting slidepack (ref1) for the detail of the 10 procedures which reference DTY on their charts and which would remain as is for this option. The table below presents an evaluation of this option against the Design Principles:

Option 0			REJECT
Description of option			
This is the current scenario. No change to existing AIP definitions of STARs or Holds.			
Design Principle 0: Maintain or enhance the current level of safety			MET
Summary of qualitative assessment No change; the level of safety is maintained.			
Design Principle 1: No change to flight behaviours			MET
Summary of qualitative assessment No change to lateral/vertical track patterns.			
Design Principle 2: Administrative change	NOT MET		
Summary of qualitative assessment No administrative changes would take place under this Design Option. Does not remove any enroute flight dependency from the DTY DVOR.			
Design Principle 3: Withdraw unnecessary STARs	NOT MET		
Summary of qualitative assessment No withdrawals would take place under this Design Option. Does not remove any enroute flight dependency from the DTY DVOR.			
Design Principle 4: Replicate using RNAV Replication policies	NOT MET		
Summary of qualitative assessment No replication would take place under this Design Option. Does not remove any enroute flight dependency from the DTY DVOR.			
Design Principle 5: Truncate original STAR then replicate the remainder	NOT MET		
Summary of qualitative assessment No truncations would take place under this Design Option. Does not remove any enroute flight dependency from the DTY DVOR.			
Design Principle 6: Technical amendment	NOT MET		
Summary of qualitative assessment No technical amendments would take place under this Design Option. Does not remove any enroute flight dependency from the DTY DVOR.			

2.5 Option 1 –Using the CAA policies, replicate STARs/holds using RNAV, exactly as defined in the AIP without considering any practicalities.

This option would replace all dependant procedures identified in the Assessment Meeting slidepack (ref1) as RNAV procedures. This table evaluates this option against the Design Principles:

Option 1			REJECT
Description of option			
All IFPs would be replicated exactly as defined in the current AIP. No account would be taken of actual usage, route segment duplication, or other factors.			
Design Principle 0: Maintain or enhance the current level of safety			MET
Summary of qualitative assessment IFPs replicated as RNAV5 procedures. The level of safety is maintained or slightly improved due to increased precision.			
Design Principle 1: No change to flight behaviours			MET
Summary of qualitative assessment No practical change to connectivity, no change to lateral/vertical track patterns.			
Design Principle 2: Administrative change	NOT MET		
Summary of qualitative assessment No administrative changes would take place under this Design Option; including changes which would logically improve the ATS route network.			
Design Principle 3: Withdraw unnecessary STARs			MET
Summary of qualitative assessment This Design Option would remove the need for contingency conventional-navigation STARs/holds based on other navaids; such IFPs could be withdrawn.			
Design Principle 4: Replicate using RNAV replication policies			MET
Summary of qualitative assessment This Design Option would purely replace like for like, including route segment duplications etc. Therefore, this Design Principle would be satisfied.			
Design Principle 5: Truncate original STAR then replicate the remainder	NOT MET		
Summary of qualitative assessment No truncations would take place under this Design Option.			
Design Principle 6: Technical amendment	NOT MET		
Summary of qualitative assessment No technical amendments would take place under this Design Option.			

2.6 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.

This option evaluates the usage of each procedure individually and creates opportunity bespoke to specific procedures. See Annex B for the detailed change for each of the procedures under this option.

This table evaluates this option against the Design Principles:

Option 2			ACCEPT and PROGRESS
Description of option			
Examine the use of existing IFPs 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.			
Design Principle 0: Maintain or enhance the current level of safety			MET
Summary of qualitative assessment IFPs replicated as RNAV5 procedures. The level of safety is maintained or slightly improved due to increased precision. Procedures can be simplified depending on actual usage today.			
Design Principle 1: No change to flight behaviours			MET
Summary of qualitative assessment No practical change to connectivity, no change to lateral/vertical track patterns.			
Design Principle 2: Administrative change			MET
Summary of qualitative assessment Evaluate current IFPs and ATS routes and identify where this Design Principle applies. Rename STAR designations in line with the current ICAO policy. For example, this option allows the Birmingham CHASE 1C STAR to be renamed as WAL 1B, with WAL as the starting waypoint and the 'B' identifier to denote the destination airport.			
Design Principle 3: Withdraw unnecessary STARs			MET
Summary of qualitative assessment Evaluate current IFPs and identify where this Design Principle applies. Analysis of flight planning history would reveal actual usage, compare with STARs performing similar function and connectivity. For example, this allows the Birmingham CHASE 3A STAR to be withdrawn as it will otherwise become redundant once the DTY STARs are RNAV'd and has very little utilisation.			
Design Principle 4: Replicate using RNAV Replication policies			MET
Summary of qualitative assessment Evaluate current IFPs and identify where this Design Principle applies. Several IFPs would satisfy this Design Principle. For example, this allows the East Midland STAR PIGOT 1H to be RNAV5 replicated and renamed as DTY 1E			
Design Principle 5: Truncate original STAR then replicate the remainder			MET
Summary of qualitative assessment Evaluate current STARs and holds and identify where this Design Principle applies. For example, this allows the LOREL 1K STAR to be truncated at FINMA, as FINMA 1L; as ATS route M605 can be used between DTY and FINMA so the additional leg is not required.			
Design Principle 6: Technical amendment			MET
Summary of qualitative assessment Evaluate current IFPs and ATS routes and identify where this Design Principle applies. Some IFPs would satisfy this Design Principle. For example, this option allows the STAR CHASE 2D to be extended to capture important Descent Planning Levels. CHASE 2D to be re-designated as MALUD 1B with the STAR extended from AMPIT to MALUD.			

2.7 Option 3 – Remove all existing STARs and holds that refer to or use the DTY DVOR.

This option removes each STAR and Hold with a DTY dependency, and replaces DTY DVOR/DME with DTY DME.

This table evaluates this option against the Design Principles:

Option 3			REJECT
Description of option			
Remove all existing IFPs for which the DTY DVOR is materially important.			
Design Principle 0: Maintain or enhance the current level of safety	NOT MET		
Summary of qualitative assessment The removal of these procedures would create a gap in the network. This would require all aircraft currently using the existing IFPs to be channelled into other, potentially busy flows/ sectors, which could greatly increase controller workload in those areas.			
Design Principle 1: No change to flight behaviours	NOT MET		
Summary of qualitative assessment Aircraft would not be able to use the current procedures, causing a change in flight behaviours to work around this.			
Design Principle 2: Administrative change	NOT MET		
Summary of qualitative assessment No administrative changes would take place under this Design Option; including changes which would logically improve the ATS route network.			
Design Principle 3: Withdraw unnecessary STARs		PARTIAL	
Summary of qualitative assessment This Design Option would remove all STARs; both necessary and unnecessary.			
Design Principle 4: Replicate using RNAV Replication policies	NOT MET		
Summary of qualitative assessment No replication would take place under this Design Option.			
Design Principle 5: Truncate original STAR then replicate the remainder	NOT MET		
Summary of qualitative assessment No truncations would take place under this Design Option.			
Design Principle 6: Technical amendment	NOT MET		
Summary of qualitative assessment No technical amendments would take place under this Design Option.			

2.8 Summary – Options Development

Using the Design Principles, we have evaluated the four concept Design Options, as summarised above.

2.9 *Option 0: Do Nothing – Retain all the STARs and holds unchanged from today's AIP definition.* This does not achieve the removal of dependencies from DTY. **Rejected.**

2.10 *Option 1: Using the CAA policies, replicate STARs/holds using RNAV, exactly as defined in the AIP without considering any practicalities* – this achieves the removal of dependencies from DTY. However, it does not improve network connectivity; it leaves route segment duplication in place and it does not account for current usage levels. **Rejected.**

2.11 *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.* This achieves the removal of dependencies from DTY. This improves overall network connectivity, reduces duplication, and accounts for current usage levels. **Accepted and progressed.**

2.12 *Option 3: Remove all existing STAR and holds that refer to or use the DTY DVOR.* This technically would remove the dependencies from DTY; however, it removes STARs and holds that are used and needed by aircraft today and going forward. **Rejected**

Conclusion: The Design Option 2 concept best meets all of the Design Principles. The shortlist comprises the Option 2 concept only. The other three option concepts are therefore not progressed.

Step 2A complete

Step 2B Options Appraisal

2.13 The baseline (do nothing) option does not achieve the removal of dependencies from DTY. The ratings for the baseline option against each of the Design Principles shows that whilst it maintains safety levels and creates no change to flight behaviours, it does not meet the remaining 4 DPs.

2.14 Following the Design Principle evaluation, we conclude that the following Design Option 2 could be used to remove the dependencies from the DTY DVOR in accordance with the Design Principles:

> *Evaluate each STAR and hold as used in practice – achieves the removal of dependencies from DTY. This improves overall network connectivity, reduces duplication, and accounts for current usage levels.*

2.15 There would be no change in fuel/CO_2/greenhouse gas emissions due to this proposal because there would be no change to lateral or vertical tracks. Fuel uplift changes are unlikely to occur. There are no costs or benefits which could be reasonably monetised due to this enroute proposal.

2.16 **Safety Assessment:** The Option 2 concept would take full account of existing usage and connectivity needs. It would ensure all IFPs are designed by an APD, as regulated by CAA SARG. 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 FMS overlays, which are not state-regulated in the same way.

2.17 DTY Option 2 Cost/Benefit Analysis – Evaluate each STAR and Hold as used in practice

The CAP1616 Appendix E cost/benefit analysis is given below.

Group	Impact	Level of Analysis	Evidence
Communities	Noise impact on health and quality of life	N/A	As there are no proposed changes to lateral or vertical tracks there will be no impact on noise or quality of life.
Communities	Air quality	N/A	No changes below 1,000ft
Wider society	Greenhouse gas impact	Monetise and quantify	No proposed changes to lateral or vertical tracks so no impact
Wider society	Capacity/ resilience	Qualitative	No changes
General Aviation	Access	N/A	No changes
General Aviation/ commercial airlines	Economic impact from increased effective capacity	Quantify	No changes
General Aviation/ commercial airlines	Fuel burn	Monetise	No proposed changes to lateral or vertical tracks so no impact.
Commercial airlines	Training cost	N/A	N/A – there is not expected to be any airline training cost.
Commercial airlines	Other costs	N/A	Updates to FMS and flight planning systems will completed via the routine AIRAC updates. There are no other known costs which would be imposed on commercial aviation.
Airport/ Air navigation service provider	Infrastructure costs/benefit	Qualitative and quantitative	The cost of implementation of the change, adaptation of systems is estimated to be £65,000. Removal of the en-route dependency enables decommissioning of the VOR (once airfields have removed their dependencies i.e. SIDs). This will yield an annual cost saving of circa £10,000 per VOR.
Airport/ Air navigation service provider	Operational costs	N/A	N/A – this proposal would not lead to changes in operational costs.
Airport/ Air navigation service provider	Deployment costs	Qualitative and quantitative	N/A – this change would be introduced via briefings and bulletins for staff, with no additional training or simulation training/costs required.

2.18 Conclusion: There would be a positive impact on safety whilst also improving the overall network connectivity.

End of Step 2B

3. Summary

3.1 This document details the STARs and Holds where the DTY VOR is material to the instrument flight procedure. It describes the current connectivity; the method used to progress the change; and the proposed connectivity.

3.2 The ATS route re-designations proposed will not change flight behaviour but will improve the layout and nomenclature of the network in the area in a logical way.

3.3 Some minor administrative changes to other Holds and STARS are included, in order to improve the consistency of charts within the AIP and to follow CAA/ICAO guidance on the naming of STARs.

3.4 The proposed connectivity remains entirely unchanged due to RNAV5 replication, with or without appropriate truncation/ATS route extension.

- routes are unchanged
- connectivity is unchanged
- hence flight behaviours and traffic patterns over the ground are unchanged.

3.5 Annex B-E below detail the IFP and ATS Route changes we are proposing to make in support of removing the DTY DVOR enroute dependency and rationalisation of the network, summarised in Table 1 below:

Ref	Airport	Type	Procedure	DTY VOR	Proposed Changes
1	Birmingham	Hold	CHASE Hold	No Dependency	RNAV replication
2	Birmingham	STAR	CHASE 1C STAR	Dependent	RNAV replication
3	Birmingham	STAR	CHASE 3A STAR	No Dependency	Withdraw
4	Birmingham	STAR	CHASE 2D STAR	Dependent	RNAV replication Extend and create 3 additional STARS
5	Birmingham	STAR	OLIVE 3A STAR	Dependent	Withdraw
6	East Midlands	Hold	PIGOT Hold	Dependent	RNAV replication
7	East Midlands	STAR	PIGOT 1H STAR	Dependent	RNAV replication
8	East Midlands	STAR	PIGOT 1J STAR	Dependent	RNAV replication with extension
9	Luton/Stansted	STAR	LOREL 1K STAR	Dependent	RNAV replication, truncation
10	En route	Hold	DAVENTRY Hold	Dependent	Withdraw

Table 1: Summary of proposed changes

- Birmingham - 1 Hold to RNAV replicate; 2 STARS to RNAV replicate (1 with extension & 3 new STARS) and 2 STARS to withdraw
- East Midlands – 1 Hold to RNAV replicate; 2 STARs to RNAV replicate (1 with extension)
- Luton/Stansted –1 STAR to RNAV replicate (with truncation)
- En route – 1 Hold to withdraw

4. Conclusion

4.1 We have assessed that there are no foreseen impacts of making the proposed changes described in the tables below (Sections 7 to 10) and conclude that making these technical changes to the procedures would not alter traffic patterns.

5. Annex A: Design Principles

5.1 Design Principles for DTY DVOR (as per Stage 1B – Ref 1)

Design Principle	Description
DP0 Safety	Airspace change must maintain or enhance the current level of safety
DP1 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
DP2 Admin	Remove unnecessary references to the DTY DVOR which are not material to the procedure
DP3 Withdraw	Some STARs are rarely used, some do the same job, some have segments in common with other STARs
DP4 Replicate	PBN Replication – replace conventional STARs/Holds with RNAV STARs/Holds
DP5 Truncate	CAA STAR Truncation Policy used here. When applied logically to STARs with many common segments, can result in withdrawal of unnecessary duplicate STARs (DP3) When the final arrangement is decided, the truncated conventional STAR is always RNAV-replicated (DP4). In the case of a change to the actual vertical profile flown in the STAR, additional fuel/CO2 analysis and justification for this this will be provided.
DP6 Technical amendment	Minor changes to a STAR which currently cannot be flown as it is formally defined, for legacy reasons – these changes always reflect what would actually happen in practical terms.

6. Annex B: Design Option 2: Procedure Detail

6.1 This section demonstrates the proposed changes for Design Option 2: Evaluate each STAR and Hold individually and use replication where appropriate.

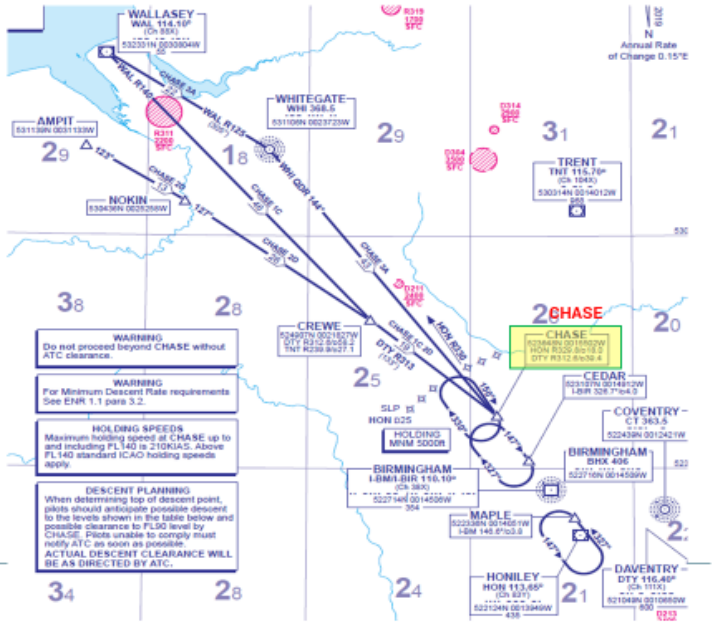
Concept Option 2:
Evaluate each IFP individually and use replication where appropriate

Birmingham Hold

1) CHASE Hold – this procedure itself is not dependent on DTY DVOR however the waypoint CHASE is defined by the DTY radial

The Hold will be RNAV'd and replicate the current published conventional CHASE Hold, removing the reference to DTY

References to DTY on chart highlighted



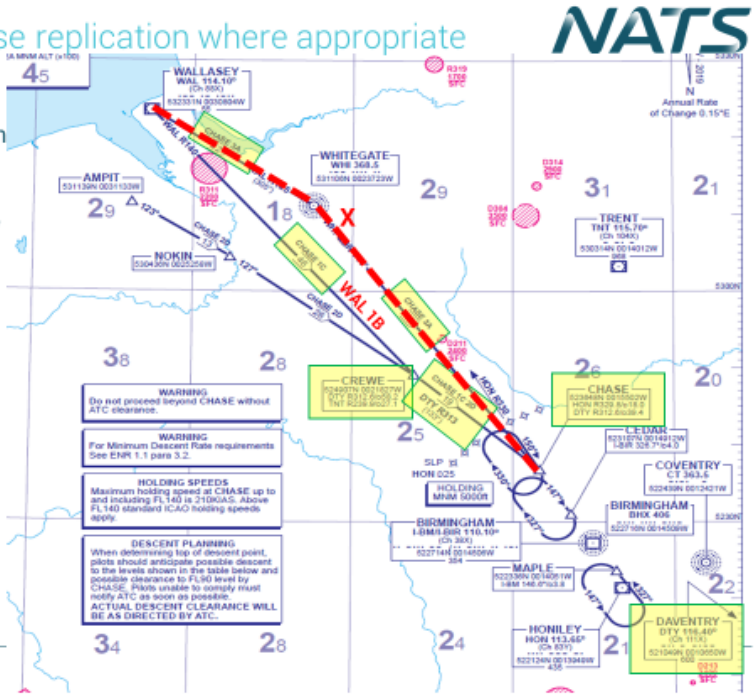
Concept Option 2:
Evaluate each IFP individually and use replication where appropriate

Birmingham STARS

2) CHASE 1C STAR– this procedure is dependent on DTY DVOR as the final leg is defined by the DTY 313 radial.
The STAR will be RNAV'd, removing the dependency, and re-designated WAL 1B

3) CHASE 3A STAR – this procedure is not dependent on DTY DVOR but on WHI NDB as it uses the WHI QDR 133 to connect to CHASE. This STAR is restricted for use by traffic FL70 and below. Due to little utilisation this STAR will be withdrawn.

References to DTY on chart highlighted



Concept Option 2:
Evaluate each IFP individually and use replication where appropriate

Birmingham STARS

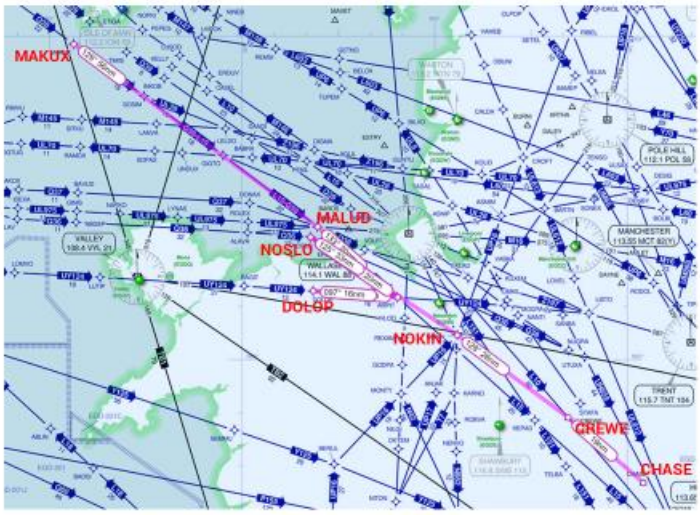
4) CHASE 2D STAR– this procedure is dependant on DTY DVOR as the final leg is defined by the DTY 313 radial. The STAR will be RNAV'd and extended/ new STARS created to capture Descent Planning Level FL270 for each route as follows:

For arrivals via (U)L975 and Q37, extended to MALUD and re-designated MALUD 1B

For arrivals via L15 and Q38, extended to MAKUX and designated MAKUX 1B

For arrivals via (U)Y124, extended to DOLOP and designated DOLOP 1B

For arrivals via Q36, extended to NOSLO and designated NOSLO 1B



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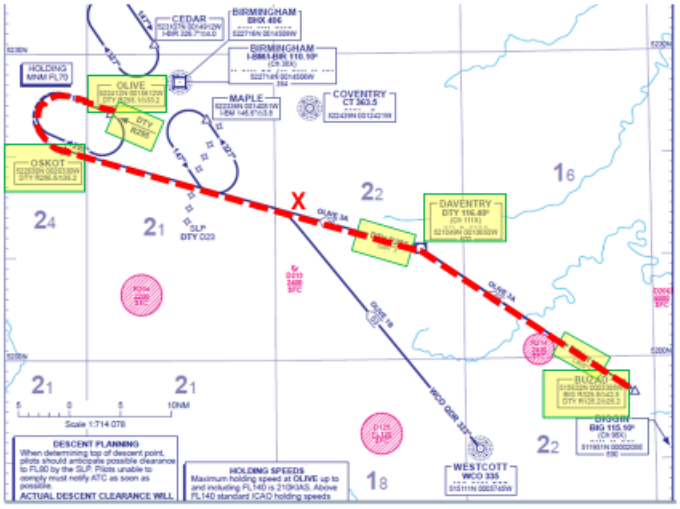
Concept Option 2:
Evaluate each IFP individually and use replication where appropriate

Birmingham STARS

5) OLIVE 3A STAR– this procedure is dependent on DTY DVOR as the leg between BUZAD & DTY is defined by the DTY 125 radial, the leg between DTY & OSKOY is defined by the DTY 287 radial, and the leg between OSKOT & OLIVE is defined by the DTY 295 radial.

This is a contingency STAR for when HON is OOS and will no longer be required so is being withdrawn.

References to DTY on chart highlighted



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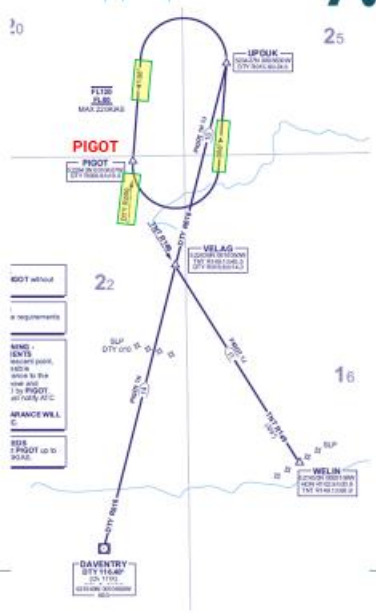
Concept Option 2:
Evaluate each IFP individually and use replication where appropriate

East Midland Hold

6) PIGOT Hold– this procedure is dependent on DTY DVOR as it is defined by the DTY 006/186 radials.

The current conventional PIGOT Hold will be replicated with an RNAV Hold. The Holding fix will remain at PIGOT in order to ensure continued EFPS functionality for East Midlands Airport.



References to DTY on chart highlighted

Concept Option 2:
Evaluate each IFP individually and use replication where appropriate

East Midland STARS

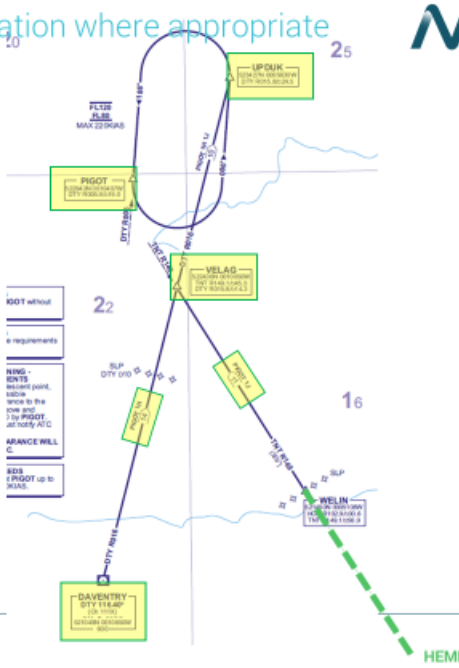
7) PIGOT 1H STAR– this procedure is dependent on DTY DVOR as the legs between DTY & VELAG and VELAG & UPDUK are defined by the DTY 016 radial.

The STAR will be RNAV'd, removing the dependency, and re-designated DTY 1E.

Waypoint PIGOT is being removed and new waypoint MIHAK added at the Speed Limiting Point.

8) PIGOT 1J STAR– this procedure is dependent on DTY DVOR as it is defined by the DTY 016 and 186 radials.

The STAR will be extended back to HEMEL to allow for the Standing Agreement, RNAV'd, removing the dependency, and re-designated HEMEL 1E.
Waypoint PIGOT will be removed.

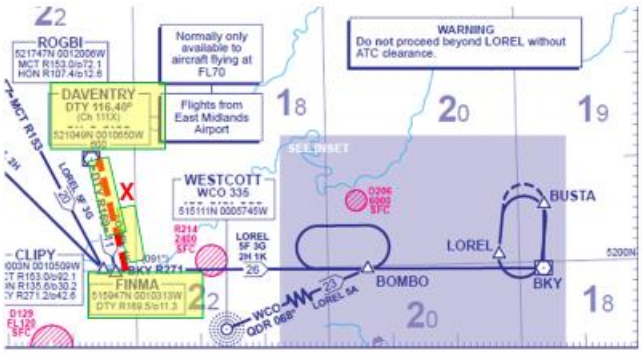


Concept Option 2:
Evaluate each IFP individually and use replication where appropriate

Luton/Stansted STARS/Holds

9) LOREL 1K STAR– this procedure is dependent on DTY DVOR as the leg between DTY & FINMA is defined by the DTY 169 radial.

This will be truncated to FINMA, RNAV'd and re-designated FINMA 1L, as route M605 makes this section redundant.



References to DTY on chart highlighted

Concept Option 2:
Evaluate each IFP individually and use replication where appropriate

En Route Hold

10) DAVENTRY Hold – this procedure is dependent on DTY DVOR as per ENR3.6-1.

This will be withdrawn due to under-utilisation.

7. Annex C: Impact assessment – Birmingham STARs and Holds

For charts and technical notes see the Assessment Meeting slidepack (Ref 2) for the current IFPs. Annex C shows the proposed changes.

Current IFP	Current route connectivity/STAR	Design Principle	How	Proposed route Connectivity/STAR	Impact of proposed change on connectivity Impact of proposed change on flight behaviour
CHASE Hold	N/A	4 Replicate	RNAV5 Replication	Not required	Same, no impact to connectivity. No predicted change to flight behaviour.
CHASE 1C STAR	L975, L10: *WAL – CREWE - CHASE*	2 Administrative 4 Replicate	RNAV5 Replication	L975, L10: *WAL – CREWE – CHASE* Rename as WAL 1B	Same, no impact to connectivity. No predicted change to flight behaviour. 'B' indicator used to designate destination airport.
CHASE 3A STAR	L975, L10: *WAL VOR – WHI NDB - CHASE*	3 Withdraw	Not required	Not required	This STAR is restricted for use by traffic FL70 and below. Due to no utilisation it is no longer required. No traffic has used this STAR in 2018 & 2019. No predicted change to flight behaviour.
CHASE 2D STAR	(U)Y124, (U)L975, Q37, (U)L15, Q38: *AMPIT – NOKIN – CREWE - CHASE*	2 Administrative 4 Replicate 5 Technical	RNAV5 Replication Important Descent Planning Levels would disappear if STAR is RNAV'd to begin at AMPIT. CHASE 2D is extended back to MALUD to capture (U)L975 traffic and three new STARS are created to capture the traffic via MAKUX (L15),	(U)L975, Q37: *MALUD – AMPIT – NOKIN – CREWE – CHASE* Rename as MALUD 1B L15, Q38: *MAKUX – MALUD – AMPIT – NOKIN – CREWE – CHASE* Rename as MAKUX 1B (U)Y124: *DOLOP – AMPIT -NOKIN – CREWE – CHASE* Rename as DOLOP 1B	Same, no impact to connectivity. No predicted change to flight behaviour. 'B' indicator used to designate destination airport.

			DOLOP ((U)Y124) and NOSLO (Q36)	Q36: *NOSLO – AMPIT - NOKIN - CREWE – CHASE* Rename as NOSLO 1B	
OLIVE 3A STAR	L10, Q3, L610, T420: *BUZAD – DTY – OSKOT - OLIVE*	3 Withdraw	Not required	Not required	This STAR is currently for when HON is OOS so is no longer required. No predicted change to flight behaviour.

8. Annex D: Impact assessment – East Midland STARs and Holds

For charts and technical notes see the Assessment Meeting slidepack (Ref 2) for the current IFPs. Annex C shows the proposed changes.

Current IFP	Current route connectivity/STAR	Design Principle	How	Proposed route Connectivity/STAR	Impact of proposed change on connectivity Impact of proposed change on flight behaviour
PIGOT Hold	N/A	2 Admin 4 Replicate	RNAV Replication	Not required	Same, no impact to connectivity. No predicted change to flight behaviour.
PIGOT 1H STAR	L10, M605: *DTY DVOR – VELAG – UPDUK - PIGOT*	2 Admin 4 Replicate 6 Technical	RNAV Replication Waypoint PIGOT removed and new waypoint MIHAK added at the SLP.	L10, M605: *DTY – MIHAK – VELAG – UPDUK* *Rename as DTY 1E*	Same, no impact to connectivity. No predicted change to flight behaviour. 'E' indicator used to designate destination airport.
PIGOT 1J STAR	L608, N57, T420: *WELIN – VELAG – UPDUK - PIGOT*	2 Admin 4 Replicate 6 Technical	RNAV Replication Waypoint PIGOT removed and extended back to HEMEL.	L608, N57, T420: HEMEL - *WELIN – VELAG – UPDUK* *Rename as HEMEL 1E*	Same, no impact to connectivity. No predicted change to flight behaviour. 'E' indicator used to designate destination airport.

9. Annex E: Impact assessment – Luton/Stansted STAR

For charts and technical notes see the Assessment Meeting slidepack (Ref 2) for the current IFPs. Annex C shows the proposed changes.

Current IFP	Current route connectivity/STAR	Design Principle	How	Proposed route Connectivity/STAR	Impact of proposed change on connectivity Impact of proposed change on flight behaviour
LOREL 1K	M605: *DTY VOR – FINMA – BOMBO – BKY – BUSTA – LOREL*	2 Admin 4 Replicate 5 Truncate	RNAV Replication Truncated to FINMA	M605: *FINMA – BOMBO BKY –BUSTA – LOREL* *Rename as FINMA 1L*	Same, no impact to connectivity. No predicted change to flight behaviour. 'L' indicator used to designate destination airport.

10. Annex F: Impact assessment – En route Hold

For charts and technical notes see the Assessment Meeting slidepack (Ref 2) for the current IFPs. Annex c shows the proposed changes.

Current IFP	Current route connectivity/STAR	Design Principle	How	Proposed route Connectivity/STAR	Impact of proposed change on connectivity Impact of proposed change on flight behaviour
DTY Hold	N/A	3 Withdraw	N/A	Not required	This Hold is not currently utilised. No predicted change to flight behaviour.

11. Annex G: List of references

Reference	Title and description
1 For publication	*DTY DVOR 1B Design Principles v1.0* Link to document on portal
2 For publication	*DTY DVOR CAP1616 Stage 1 Assessment Meeting Slidepack* Slide pack presented at the Stage 1 assessment meeting. This is the primary reference material for illustrations of IFP and ATS Route amendments in this multi-gateway document. Link to document on portal.
3 For publication	*DTY DVOR Assessment Meeting minutes (redacted)* Link to document on portal.
4 For publication	*DAP1916 DTY DVOR Statement of Need V3* Link to document on portal.
5 Not for publication	*DTY DVOR Removal Engagement Evidence* For CAA Use Only

12. Annex H: Engagement Evidence

This section summarises the engagement activities we conducted, which influenced the design decisions / considerations. Copies of the engagement material will be sent to the CAA (Ref 5).

Stakeholder	Type of engagement	Date	Notes
Birmingham Airport ATC	Email	07/11/2019	Initial email outlining proposed changes to STARs/Holds as part of DVOR Rationalisation; seeking feedback
Birmingham Airport ATC	Meeting	18/12/2019	Meeting to review proposed changes. Minutes of meeting sent via email.
East Midlands Airport ATC	Email	21/11/2019	Initial email outlining proposed changes to STARs/Holds as part of DVOR Rationalisation; seeking feedback
East Midlands Airport ATC	Meeting	18/12/2019	Meeting to review proposed changes in line with EMA ACP for DTY SIDs. Minutes of meeting sent via email.
Luton Airport ATC	Email	07/11/2019	Initial email outlining proposed changes to STARs/Holds as part of DVOR Rationalisation; positive response
Stansted Airport ATC	Email	07/11/2019	Initial email outlining proposed changes to STARs/Holds as part of DVOR Rationalisation; positive response

Table 1: Engagement with Airports for DTY proposed changes

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