DVOR SAM-OCK STARs Documentation: Stage 4 Update and Submit

Step 4A Update Design

Step 4B SAM-OCK Airspace Change Proposal

NATS Uncontrolled

Publication history

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Step 4A – Update Design

Since the introduction of SAIP AD1 in November 2017, no flights have filed flightplans to Heathrow (EGLL) via OCK 3E (originally planned to be replicated as BILNI 1H under this proposal) nor to Gatwick (EGKK) via WILLO 3D (originally planned to be replicated as BILNI 1G under this proposal). The RNAV1 STARs OTMET 1H and OTMET 1G are used instead.

We propose to withdraw the planned replication of OCK 3E/BILNI 1H and WILLO 3D/BILNI 1G in light of this evidence, and indeed withdraw both OCK 3E and WILLO 3D STARs from service.

In the event that a flight is unable to comply with RNAV1 intends to land at either airport, Heathrow EGLL RNAV5 arrivals may use the OCK 2C (truncated/replicated to become HAZEL 1H under this proposal) and Gatwick RNAV5 arrivals the WILLO 3A (truncated/replicated to become GWC 1G under this proposal).

Due to the relative simplicity and lack of impact of this proposal, we are requesting an 8-week decision period instead of the typical 10 weeks. If the proposal is approved by the CAA, the proposed design would be implemented on 6th December 2018, which is AIRAC 13 of 2018. The timeline for this proposal is therefore fixed by this planned implementation date. To ensure we meet this, we would need a CAA decision by the AIS deadline of 7th September 2018 (8 weeks after the ACP submission date of Friday 6th July 2018).

1. Step 4B Contents

2. Introduction

NATS operates 46 DVORs 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 mandated ATS routes. 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 navaids.

Within the UK, there are several en-route instrument flight procedures (IFP) which are dependent on these radio navigation aids (navaids). As a number of them are scheduled to be removed from service, the en-route IFP definitions require updating so that they no longer refer to the navaids scheduled to be removed.

This airspace proposal is limited to en-route IFPs, in the UK AIP, using DVORs Ockham (OCK) and Southampton (SAM) as materially important navaids. The scope of the proposal is limited to standard instrument arrival routes (STARs) and their associated holding patterns, referring to OCK and/or SAM as conventional navaids, where NATS is the primary air navigation services provider (ANSP).

Airport-based procedures such as standard instrument departures (SIDs) and instrument approaches are not relevant to the en-route scope of this proposed. Airport operators are separately developing their own equivalent procedures presuming DVOR rationalisation.

As described in Section 8.2.1 below, there are several methods in which a STAR/ hold navaids dependency 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 OCK/ SAM. This method improves the overall network connectivity, reduces duplication and accounts for the current usage levels.

3. Executive Summary

In support of the DVOR Rationalisation Programme, NATS has identified all AIP en route references to, and dependencies on, the OCK and SAM navaids. In order to remove AIP IFP dependencies from these navaids, a list of six design principles have been created which have been used to assess the individual IFPs against. The highest priority principle has been to ensure that none of the proposed technical changes would result in a change to flight behaviours. The remaining design principles focussed on techniques which could be used to remove the dependencies, such as IFP replication or truncation.

Three separate design options were developed in order to remove the en-route IFP dependencies on the OCK and SAM DVORs. The first considered option, of doing nothing, would retain all of the current STARs and holds unchanged from today's AIP definition. Option 1 would replicate each IFP with an OCK or SAM dependency, exactly as defined today. Option 2 would evaluate each IFP individually, as used in practice, using replication and/or truncation where appropriate.

The design principles mentioned above were used to qualitatively assess each of the three options. This process reduced the three options down to one known as Option 2 which is the preferred concept option presented here. There has been no public or aviation consultation required for this airspace change proposal as these are technical changes to the IFPs, with no material changes to the current operation.

4. Current Airspace Description

The current en-route IFPs, which use the OCK or SAM DVORs as navaids, are all IFPs associated with the following airports: Heathrow, Gatwick, Stansted, Luton, Southampton and Bournemouth. These have all been summarised in Table 1 below and can also be found in the Multi Gateway assessment document [(Ref 1)].

Associated Airport	Current IFP	Current Route Connectivity
Heathrow	OCK 4B	DOMUT-KATHY-HAZEL-OCK
Heathrow	OCK 2C	SAM-HAZEL-OCK
Heathrow	OCK 3E	BILNI-KUMIL-ELDER-BEGTO-HAZEL-OCK
Heathrow	OCK 1D	HON-WOD-OCK
Heathrow	OCK 1A	KENET-OCK
Heathrow	OCK 2F	BEDEK-NIGIT-OCK
Heathrow	OCK 1G	BIG-DORKI-OCK
Heathrow	OCK 1H	LAM-DORKI-OCK
Heathrow	BIG 1G	OCK-DORKI-HILLY-BIG
Heathrow	WEALD 1G	OCK-DORKI-HILLY-WEALD
Heathrow	All TOMMOs	Equivalent to OCK arrivals
Gatwick	WILLO 3A	SAM-GWC-HOLLY-WILLO
Gatwick	WILLO 4C	DOMUT-KATHY-AVANT-GWC-HOLLY-WILLO
Gatwick	WILLO 3D	BILNI-KUMIL-AVANT-GWC-HOLLY-WILLO
Gatwick	TIMBA 1C	GWC-SFD-TIMBA
Gatwick	TIMBA 1D	MID-MAY-LARCK-TIMBA
Gatwick	ASTRA 3A 4C 3D	Contingency, equivalent to WILLO arrivals
Gatwick	LUMBA1C, 1D	Contingency, equivalent to TIMBA 1C, 1D stack-swap
Stansted and Luton	LOREL 4C	AVANT-OCK-VATON-BPK-BKY-BUSTA-LOREL
Stansted and Luton	LOREL 2D	GIBSO-BEGTO-AVANT-OCK-VATON- BPK-BKY-BUSTA-LOREL
Stansted and Luton	LOREL 2S	BEDEK-NIGIT-OCK-VATON- BPK-BKY-BUSTA-LOREL
Stansted and Luton	ASKEY4C 2D 2S	As per LOREL 4C 2D 2S

Associated Airport	Current IFP	Current Route Connectivity
Southampton and Bournemouth	SAM 2A	NEDEX-KIDLI-CPT-PEPIS-SAM
Southampton and Bournemouth	SAM 1B	UMBUR-OCK-PEPIS-SAM
Southampton and Bournemouth	SAM 1C	WCO-PEPIS-SAM
Southampton and Bournemouth	SAM 1F	KENET-CPT-PEPIS-SAM
Southampton and Bournemouth	SAM 1G	HON-BAMBO-EVSEM-RISIN-NUBRI-PEPIS-SAM
Southampton and Bournemouth	SAM 1E	PEPUL-MOVEN-BAMBO-EVSEM-RISIN-NUBRI-PEPIS-SAM
Southampton and Bournemouth	NEDUL 1A	THRED-NEDUL

Table 1: Current IFPs with dependencies on OCK or SAM DVORs

4.1 Structures and Routes

The full technical notes and associated charts for each of the above IFPs can be found in the following references:

- Heathrow IFPs – Slides 46-52 of the Framework Briefing slide pack (Ref 3)
- Gatwick IFPs – Slides 55-58 of the Framework Briefing slide pack (Ref 3)
- Stansted and Luton IFPs – Slides 59-60 of the Framework Briefing slide pack (Ref 3)
- Southampton and Bournemouth IFPs – Slides 63-66 of the Framework Briefing slide pack (Ref 3)

4.2 Airspace usage and proposed effect

The proportions of aircraft, including fleet mix and operators, using any of the IFPs related to this project would not change as an outcome of the proposed changes. There would be no change to pilot or controller behaviour, and no change to lateral or vertical traffic dispersion. Therefore the airspace usage and current operation will stay the same as today with no change.

4.3 Operational efficiency, complexity, delays and choke points

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

4.4 Safety issues

There are no specific safety issues associated with any of the IFPs related to this project, to be solved by 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 project who ensures that the safety representatives from SARG have oversight of the safety assurance process. Paragraph 10 contains further details on the safety assessment for this proposal.

4.5 Environmental issues

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

5. Statement of Need

The text from the DAP1916 Statement of Need [Ref 2] submitted in October 2017 for this airspace change proposal summarises the individual changes in support of the en-route dependency on the OCK and SAM DVORs, due for removal in 2018. This has been included in Appendix section 16.2 below.

6. Proposed Airspace Description

6.1 Objectives/ requirements for Proposed Design

The primary objective for this proposed airspace design is to remove any en-route IFP dependencies on the OCK and SAM DVORs. This will be achieved by replacing the current connectivity using RNAV5 procedures. The en-route flight procedures under consideration are all STARs, en-route holding patterns and terminal holding patterns where OCK or SAM are material to their definition.

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 has been used as a 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 en-route network to the termination point without introducing any change to existing track patterns over the ground. RNAV5 is mandated for en-route IFPs and does not require consultation under the CAA's replication policy. It would also allow a simple RNAV5 to RNAV1 conversion; however this is out of the scope of this project.

This project has also been used as an opportunity to review the relevance of the existing procedures and their details. As such, methods such as introducing truncations where an existing ATS route already formed the initial section of a STAR have been explored and considered, in line with the STAR replication policy mentioned above.

6.2 Proposed New Airspace/ Route Definition and Usage

There is no predicted change to flight behaviour as a consequence of this airspace change proposal. This means that there would be no change to pilot or controller behaviour (apart from designation changes), and no change to lateral or vertical traffic dispersion. The proposed changes will also not alter route usage within the associated airspace.

A full summary of all of the proposed changes and associated impacts can be found in the Multi Gateway Assessment document [Ref 1]. This document details the impact assessment which was completed for all of the IFPs where OCK or SAM DVORs are material to the procedure, as listed below. This document includes a full list of all IFPs: their current connectivity, the proposed connectivity and the impact of the proposed change for each IFP.

- Heathrow OCK/ TOMMO STARs (ten individual IFPs)
- Gatwick WILLO/ TIMBA STARs (six individual IFPs)
- Stansted and Luton LOREL/ASKEY STARs (four individual IFPs)
- Southampton and Bournemouth SAM/ NEDUL STARs (seven individual IFPs)

Charts and technical notes on all 29 of the above individual IFPs can be found in the Framework Briefing document [Ref 3].

For all except two of the procedures, the proposed connectivity remained entirely unchanged due to RNAV5 replication; with or without appropriate truncation. As mentioned above, this means no change to route usage or traffic patterns over the ground.

There were two instances where the current procedures needed changing in order to continue working. The Heathrow OCK 1D IFP is currently a stack-swap STAR which is not flightplannable due to a lack of connectivity. As such, arrivals would be tactically instructed to OCK by controllers. The proposed technical amendment to this IFP will formally reflect that tactical solution, reduce the manual work and would introduce no change to traffic patterns.
The other IFP requiring a change is the Southampton/ Bournemouth SAM1G STAR which is not currently flyable due to legacy problems with close proximity of waypoints and an incorrect route descriptor. The proposed technical amendment will remove a defunct waypoint from a segment of the STAR and convert all waypoints to the correct definition. These changes will not introduce any changes to traffic patterns.

The location of OCK would be renamed as a 5-letter name code 'INTED', and the location of SAM would become 'ATPAK'. These changes will also not introduce any changes to traffic patterns.

The summary of the proposed changes is that changing the procedures will not alter the traffic patterns or route usage, due to the truncation/replication of STARs and the associated appropriate revision or addition of ATS routes.

The following technical documents provide further information on the proposed designs:

- A document summarising the draft AIP changes lists the changes, alongside the AIP pages where these changes need to occur [Ref 4].

- A technical definition document which contains the WGS84 data in excel format [Ref 5].

7. Impacts and Consultation

7.1 Net impacts summary for proposed route

Category	Impact	Evidence
Safety/Complexity	No impact on safety or complexity	See Paragraph 4.4 and Section 10
Capacity/Delay	No impact on delay	See Paragraph 4.3
Fuel Efficiency/CO_2	No impact, there will be no change to lateral or vertical tracks	See Paragraph 7.6
Noise – Leq/SEL	No impact, this is a Level 2C change	See Paragraph 7.7
Tranquillity, visual intrusion (AONBs & National Parks)	No impact, this is a Level 2C change	See Paragraph 7.7
Local Air Quality	No impact, this is a Level 2C change	See Paragraph 7.7
Other Airspace Users	No impact, no changes to volume or classification of CAS	See Paragraphs 7.3 to 7.5

7.2 Units affected by the proposal

The following airports have been engaged throughout the project:

- Heathrow
- Gatwick
- Stansted and Luton
- Southampton and Bournemouth

The airports have been fully briefed on the proposed changes and the justification behind why the en-route DVOR dependencies are being removed. The proposed changes have all been designed to be invisible from an airport' perspective, asides from the AIP changes described below.

The proposed changes will alter nomenclature in the aerodrome AIP pages for the above airports. There will also be a few minor technical amendments such as STAR truncations. Asides from these technical changes, there are no other impacts anticipated for airports as the scope of these changes if just for en-route procedures, not airports.

Airports will complete their own airspace change proposals if they wish to remove dependencies from airport-specific local procedures, such as SIDs and approaches.

There has been no consultation held as part of these proposed airspace changes as there are not expected to be any changes in impact to any stakeholders, such as airfield units. The changes are purely technical changes which will not lead to any material change to the current operation.

7.3 Military impact and consultation

A CAA-led consultation was held with NATMAC in 2009, with a NATMAC Informative produced on 7th October 2010. Airlines were broadly supportive, with the NATS reduction in expenditure as a favourable item.

As mentioned above, there has not been a consultation held as part of these proposed airspace changes as there are not expected to be any changes in impact to any stakeholders, such as military airspace users.

7.4 General Aviation airspace users impact and consultation

As mentioned above, there has been no other consultation held as part of these proposed airspace changes as there are not expected to be any changes in impact to any stakeholders, such as General Aviation airspace users.

7.5 Commercial air transport impact and consultation

There would only be technical changes for commercial air transport such as nomenclature and RNAV5 route replication. On the two occasions where the existing connectivity does not work and have been proposed corrections, there would be no change to flight behaviour as there would be no change to lateral or vertical tracks.

As mentioned above, there has not been a consultation as part of these proposed airspace changes as there are not expected to be any changes in impact to any stakeholders, such as commercial air transport.

7.6 CO_2 environmental analysis impact and consultation

There would be no change in fuel, CO_2 or greenhouse gases and emissions as a result of the proposed changes because there would no change to lateral or vertical tracks. As mentioned above, there has not been a consultation as part of these proposed changes.

This aligns with the highest priority design principle of ensuring that none of the proposed technical changes to IFP definitions result in any chance to actual flight behaviours.

7.7 Local environmental impacts and consultation

There would be no change in environmental impacts as a result of the proposed changes because there would be no change to lateral or vertical tracks. As mentioned above, there has not been a consultation as part of these proposed changes.

This aligns with the highest priority design principle of ensuring that none of the proposed technical changes to IFP definitions result in any change to actual flight behaviours.

7.8 Economic impacts

There are no predicted economic changes, nor any costs or benefits which could be monetised, as a result of the proposed changes. The development of this airspace change proposal has not been informed by any economic constraints or opportunities.

8. Analysis of Options

8.1 Airspace Change Design Options

In order to remove the en-route IFP dependencies on the OCK and SAM DVORs, NATS developed three separate options on how best to adapt the UK airspace in support of this. These are known as Option 0 – do nothing, Option 1 and Option 2. They are also summarised in the multi-gateway document (Ref 1).

The first considered option, of doing nothing, would retain all of the current STARs and holds unchanged from today's AIP definition. Options 1 and 2 involve making changes to today's AIP definition. Option 1 would replicate each STAR and hold with a OCK or SAM dependency, exactly as defined today. Whilst Option 2 would evaluate each STAR and hold individually, as used in practice, using replication where appropriate.

8.2 Design Options Assessment

8.2.1 Design Principles

Design principles have been created in order to assess the options described in Section 8.1 above. They have been constructed around the general objectives for this airspace change proposal such as removing en-route dependencies from OCK and SAM, and reviewing the relevance of existing procedures. For example, as part of updating the final proposed design as described on Page 2 above, it was concluded that two of the IFPs were no longer required as flights can flightplan via other routes.

The analogy of a toolbox was used to describe potential methods of removing the en-route dependencies from the DVORs, which each tool having a particular function, in combination with other tools when appropriate. This analogy has been used to construct the design principles around.

The overriding design principle, with the highest priority, for this airspace change has been that none of the proposed technical changes to the definition of IFPs would result in a change to actual flight behaviours: laterally, vertically or in dispersal.

The other design principles for this proposal are:

Design Principle	Description
DP1 Admin	Remove unnecessary references to DVORs which are not material to the procedure
DP2 Withdraw	Some STARs are rarely used, some do the same job, some have segments in common with other STARs (see DP4 Truncate)
DP3 Replicate	PBN Replication – replace conventional STARs/Holds with RNAV STARs/Holds
DP4 Truncate	Draft STAR Truncation Policy, awaiting formal publication by CAA ISP, used here as agreed with CAA. When applied logically to STARs with many common segments, can result in withdrawal of unnecessary duplicate STARs (DP2) When the final arrangement is decided, the truncated conventional STAR is always RNAV-replicated (DP3)
DP5 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.

The six design principles summarised above have been detailed fully in the multi-gateway document (Ref 1), which includes a contextual example of each design principle being put into practice.

Two other design principles were considered and discarded as not appropriate for use. One principle was to use FMS overlays in order to allow continued "conventional" STAR use, and the other was to initiate a complete redesign of the STARs. Neither of these design principles has been included in this proposal, following CAA engagement.

8.2.2 Options Assessment using the Design Principles

The three options outlined in Section 8.1 above were assessed against the following six design principles:

- Design principle 0: no change to flight behaviours
- Design principle 1: administrative change
- Design principle 2: withdraw unnecessary STARs
- Design principle 3: replicate using RNAV replication policies
- Design principle 4: truncate original STAR then replicate the remainder
- Design principle 5: technical amendment

Each of the three options was qualitatively assessed against each design principle in order to evaluate whether the principle had been met, partially met or not at all. The first Option 0, of doing nothing, did not meet any of the design principles except for principle 0: no changes to flight behaviours. Option 0 therefore does not achieve the removal of dependencies from the OCK and SAM dependencies and has been rejected.

Option 1, concerning the replication of each STAR and hold, fully met two design principles of not changing flight behaviours (Design Principle 0) and of completing RNAV replication (Design Principle 3). However, it only partially met Design Principle 2 of withdrawing unnecessary STARs; and did not meet any of the final three principles. Although Option 1 achieves the DVOR dependencies, it does not improve network connectivity, leave route segment duplication in place nor account for current usage levels. Therefore Option 1 has also been rejected.

The final Option 2, involving an individual evaluation of each IFP, fully met all six of the design principles. As this option focussed on a flexible approach for removing the DVOR dependencies, it was able to meet all of the proposed technical design principles; whilst still ensuring no changes to flight behaviours, which was the highest priority design principle.

The conclusion of this assessment was to reduce the number of design concepts to one, known as Option 2 which best meets all of the design principles. This removes the DVOR dependencies whilst also improving the overall network connectivity, reducing duplication and taking into consideration the current usage levels.

A full summary of the above assessment can be found in Section 2 of the Stages 1-3 Multi-Gateway document (Ref 1).

9. Airspace Description Requirements

	The proposal should provide a full description of the proposed change including the following:	Description for this proposal
a	The type of route or structure; for example, airway, UAR, Conditional Route, Advisory Route, CTR, SIDs/STARs, holding patterns, etc	See Section 6.
b	The hours of operation of the airspace and any seasonal variations	H24
c	Interaction with domestic and international en-route structures, TMAs or CTAs with an explanation of how connectivity is to be achieved. Connectivity to aerodromes not connected to CAS should be covered	See Section 6.2 and Reference 4
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
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	See Sections 4.2 and 6.2.
f	Analysis of the impact of the traffic mix on complexity and workload of operations	See Sections 4.2 and 6.2.
g	Evidence of relevant draft Letters of Agreement, including any arising out of consultation and/or airspace management requirements	N/A
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
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
k	Details of and justification for any delegation of ATS	No change to the delegation of ATS.

10. Safety Assessment

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

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

10.3 The Option 2 concept would take full account of existing usage and connectivity needs.

10.4 There would be a qualitative improvement in safety because each remaining IFP would use improved navigation specifications and be defined in an official manner.

10.5 Today's conventional IFPs are known to be flown using FMS overlays, which are not state-regulated in the same way.

10.6 Therefore, there would be a positive impact on safety whilst also improving the overall network connectivity.

12. 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 (technical change only)
b	Impact on VFR operations (including VFR routes where applicable);	No impact on VFR operations. See Section 7.4
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 (technical change only). See Section 6.2.
d	Impact on aerodromes and other specific activities within or adjacent to the proposed airspace	N/A
e	Any flight planning restrictions and/or route requirements	N/A

13. Supporting Infrastructure/ Resources

	General requirements	Evidence of compliance/ proposed mitigation
a	Evidence to support RNAV and conventional navigation as appropriate with details of planned availability and contingency procedures	N/A – current RNAV5 coverage is demonstrably adequate
b	Evidence to support primary and secondary surveillance radar (SSR) with details of planned availability and contingency procedures	Traffic uses the same regions 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 comms 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 continue to apply. Some contingency conventional IFPs no longer required.
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
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.

14. 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	There is no change proposed to the controlled airspace. See Section 6.2.
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.	Buffers N/A
c	The Air Traffic Management system must be adequate to ensure that prescribed separation can be maintained between aircraft within the airspace structure and safe management of interfaces with other airspace structures	No change
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	No change
e	Within the constraints of safety and efficiency, the airspace classification should permit access to as many classes of user as practicable	No change to airspace classification proposed.
f	There must be assurance, as far as practicable, against unauthorised incursions. This is usually done through the classification and promulgation	No change 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	This will be promulgated via 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	N/A
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	N/A

	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	RNAV5 navaid coverage is demonstrably adequate.
b	Where ATS routes adjoin terminal airspace there shall be suitable link routes as necessary for the ATM task	See Section 6.2
c	All new routes should be designed to accommodate P-RNAV navigational requirements	RNAV5 will be used

	Terminal airspace requirements	Evidence of compliance/ proposed mitigation
	See Section 6.2	

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

15. 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
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	See Paragraph 7.6
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 Framework Briefing slide pack (Ref 3) No change to environmental impacts
g	Traffic forecasts	10-year traffic forecasts, from the anticipated date of implementation, must be provided (if not already provided elsewhere in the proposal)	N/A- see Paragraph 7.6
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 impact - see Paragraph 7.1.

16. Appendices

16.1 References

Ref No	Name	Hyperlink
1	L4017 DVOR SAM OCK STARs, CAP1616 Stages 1-3 Multi-Gateway	Link
2	E42445 – L4017 SAM OCK DAP1916	Link
3	L4017 SAM OCK VOR FWB	Link
4	AIP changes in support of DVOR rationalisation for OCK and SAM V7	Supplied alongside ACP
5	DVOR OCK SAM Technical Definition Document WGS84 V2	Supplied alongside ACP

16.2 DAP1916 DVOR Rationalisation for OCK and SAM

Updates to previous items within DAP1916 ref E41288, in support of the removal of the en-route dependency on the SAM DVOR due for removal in 2018:

1) SAM 2A arrival: convert from conventional to RNAV 5 and re-designate NEDEX 1S

Update: SAM 2A withdrawn from use (see item 7d for replacement connectivity)

2) SAM 1B arrival: convert from conventional to RNAV 5 and re-designate UMBUR 1S

3) SAM 1C arrival: convert from conventional to RNAV 5, truncate at COWLY and re-designate COWLY 1S

4) SAM 1F arrival: convert from conventional to RNAV 5 and re-designate as KENET 1S

Update: SAM 1F STAR truncated at CPT, RNAV replicated, redesignated CPT 1S.

5) NEDUL 1A arrival: convert from conventional to RNAV 5 and re-designate as THRED 1S

6) SAM 1E arrival: convert from BRNAV to RNAV 5 removing EVSEM and re-designate as PEPUL 1S

Update: SAM 1E withdrawn from use (see item 7d for replacement connectivity)

7) SAM 1G arrival: convert from BRNAV to RNAV 5 removing unnecessary intermediate point EVSEM and re-designate as HON 1S

Update:

7a) 5LNC BAMBO to be renamed BALYK due ICARD clash

7b) Extend ATS route L8 HON-NANUM-BALYK, replacing connectivity for former SAM 1G

7c) Replicate STAR from BALYK southwards as RNAV5, re-designate BALYK 1S

7d) Create new ATS route Y322 from PEPUL to BALYK, replacing connectivity for former SAM SAM 1E, also covers former SAM 2A.

8) SAM Hold: RNAV the Hold and re-designate as ATPAK

9) PEPIS Hold: RNAV the Hold

10) NEDUL Hold: RNAV the Hold

11) WILLO 3A arrival: convert from conventional to RNAV 5 and re-designate POZAR 1G and truncate at POZAR (GWC)

Update: As above but retain 3LNC GWC, designator to be GWC 1G

12) WILLO 4C arrival: convert from conventional to RNAV 5 and re-designate AVANT 1G and truncate at AVANT

Update: STAR truncated at ABSAV removing DOMUT and KATHY from the STAR, route now DOMUT-L980-KATHY-L980-ABSAV, replicate remainder to RNAV5, re-designate ABSAV 1G

13) WILLO 3D arrival: convert from conventional to RNAV 5 and re-designate BILNI 1G

14) WILLO, DOMUT, BILNI & KATHY Holds: check Protected Area following their RNAVing as part of SAIP AD1.1

Update: DOMUT hold to remain unchanged in ENR3.6 but removed from STAR duties, see items 12 and 16.

15) GWC Hold: RNAV the Hold and re-designate it as POZAR

Update: Retain 3LNC GWC

16) OCK 4B arrival: convert from conventional to RNAV 5 and re-designate DOMUT 1H

Update: STAR truncated at KATHY removing DOMUT from the STAR, route now DOMUT-L980-KATHY, replicate remainder to RNAV5, re-designate KATHY 1H

17) OCK 2C arrival: convert from conventional to RNAV 5 and re-designate as HAZEL 1H (and truncate at HAZEL)

18) OCK 3E arrival: convert from conventional to RNAV 5 and re-designate as BILNI 1H

19) OCK 1D arrival: convert from conventional to RNAV 5 and re-designate as TOBID 1H (amendment to track)

Additional info: Route via TOBID corrects an existing disconnect from the NW where LL BNN arrivals all route TOBID but this stack swap STAR to OCK did not.

20) OCK 1A arrival: convert from conventional to RNAV 5 and re-designate as KENET 1H (possible removal of STAR)

21) OCK 2F arrival: convert from conventional to RNAV 5 and re-designate as NIGIT 1H (and truncate at NIGIT)

22) OCK Hold: RNAV Hold and re-designate as INTED

23) Amend the Tables in EGHH AD2.22 Paras 1a and 2a

Update: Check AD 2.22 Flight Procedures Inbound sections for HH HI GW SS LL KK and amend as required. Also check & amend AD 2.24 Charts Related to an Aerodrome for each.

24) Editorial changes to EGLC SIDs and STARs to amend SAM to ATPAK

25) Amend the Table in EGLF AD2.22 2e

26) Editorial changes to EGMC STARs to amend SAM to ATPAK and AD 2.22 Tables

27) Editorial changes to EGTO AD 2.22 Tables

28) Editorial changes to EGKB AD2.22 Tables

Additional items below remove the en-route dependencies from the remaining OCK en route IFPs and cover the additional administrative changes:

29) OCK 1G arrival: convert conventional to RNAV5 via replication, re-designate BIG 1H

30) OCK 1H arrival: convert conventional to RNAV5 via replication, re-designate LAM 1H

31) BIG 1G arrival: convert conventional to RNAV5 via replication, re-designate INTED 1H, withdraw contingency WEALD 1G

32) BIG hold: convert conventional to RNAV via replication, retain 3LNC BIG designator

33) LOREL 4C arrival: convert conventional to RNAV5 via replication, re-designate AVANT 1L

34) LOREL 2D arrival: withdrawn from use. Add new ATS route L89 GIBSO BEGTO AVANT, then see item 33 for onward connectivity

35) LOREL 2S arrival: convert conventional to RNAV5 via replication, re-designate BEDEK 1L

36) VATON, LOREL holds: convert conventional to RNAV via replication, retain original designations

37) The following conventional STARs are withdrawn – they were based on OCK VOR u/s:

37a) EGLL TOMMO conventional STARs (all)

37b) EGKK ASTRA conventional STARs 3A, 4C, 4D

37c) EGGW ASKEY conventional STARs 4C, 2D, 2S

37d) EGSS ASKEY conventional STARs 4C, 2D, 2S

38) Amend AD 2-EGHH-7-3 (and equivalent HI) STAR plates with 3LNC SAM to 5LNC ATPAK, rename SAM2D to ELDAX1S.

39) Other editorial or administrative changes to be agreed.

End of document